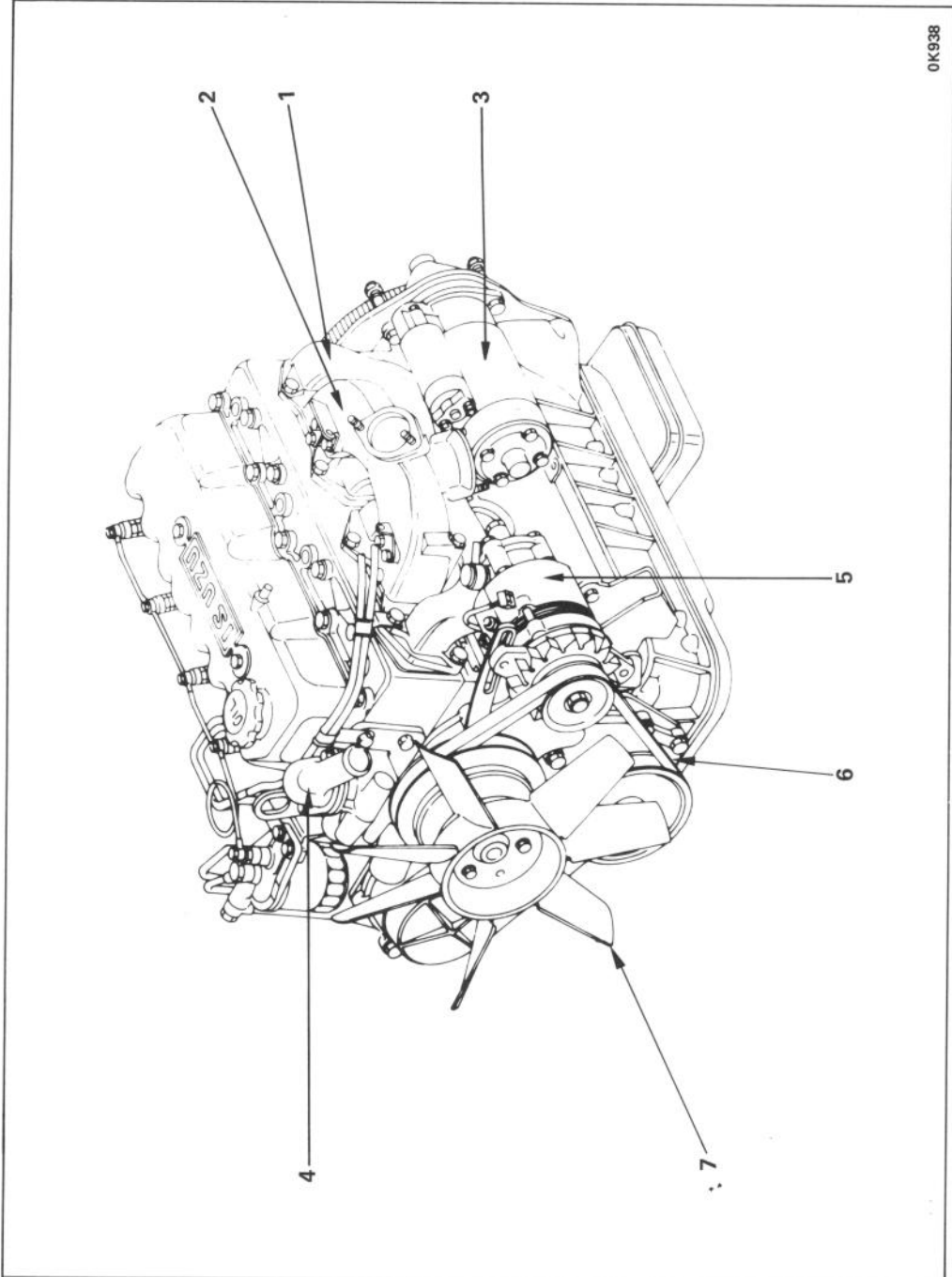


EXTERNAL PARTS (Left hand side)

This illustration is based on the C190 and C240 models.



OK938

Reassembly steps

- 1. Exhaust manifold
- 2. Intake manifold
- 3. Starter motor
- 4. Thermostat housing

- 5. Generator assembly
- ▲ 6. Fan belt
- 7. Cooling fan and spacer

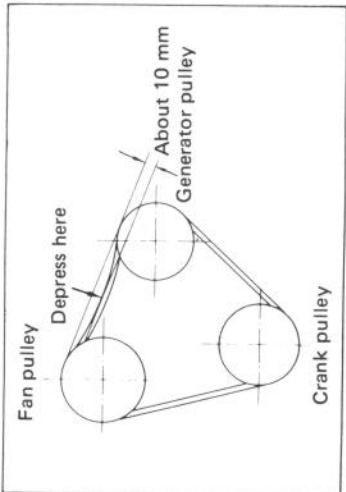


Important operation

6. Fan belt

Specified belt deflection

Fan belt	(mm)	10
----------	------	----



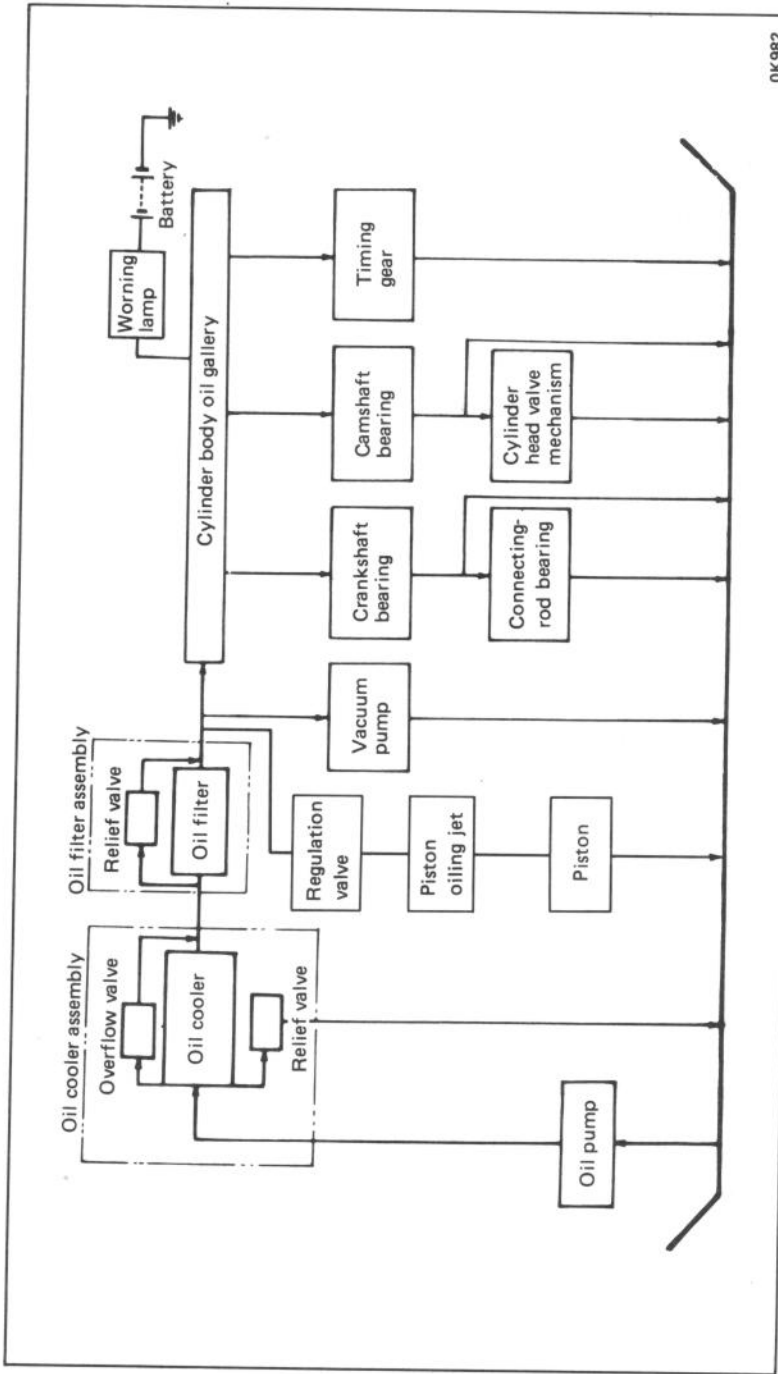
SECTION 3

LUBRICATING SYSTEM

INDEX

CONTENTS	PAGE
General description .....	3- 1
Oil pump .....	3- 2
With oil cooler type .....	3- 8
Oil cooler .....	3-10
Oil jet pipe and relief valve .....	3-10

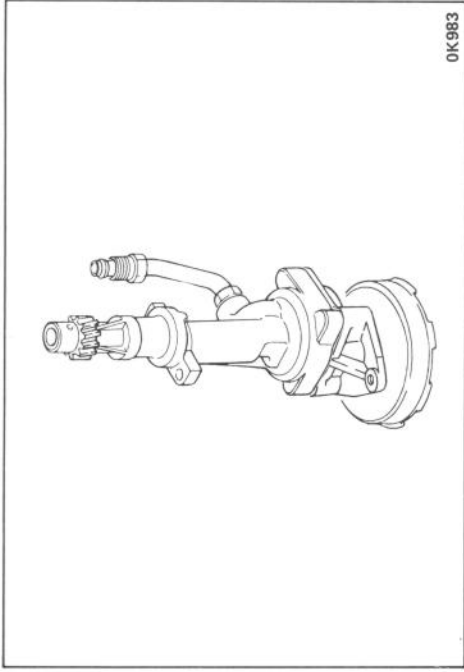
GENERAL DESCRIPTION



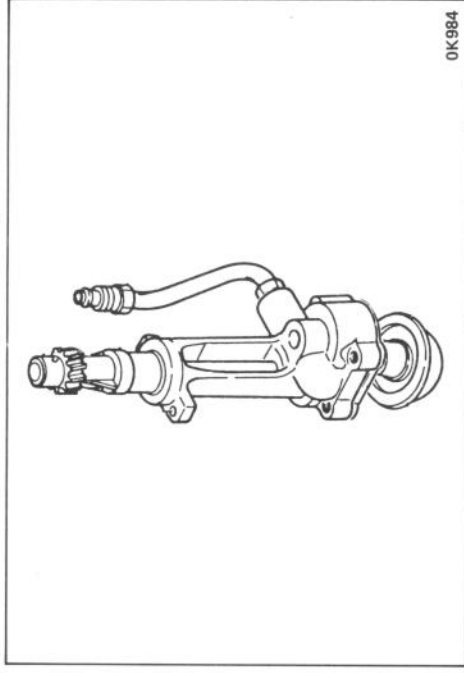
OK982

OIL PUMP

This illustration is based on rotor type

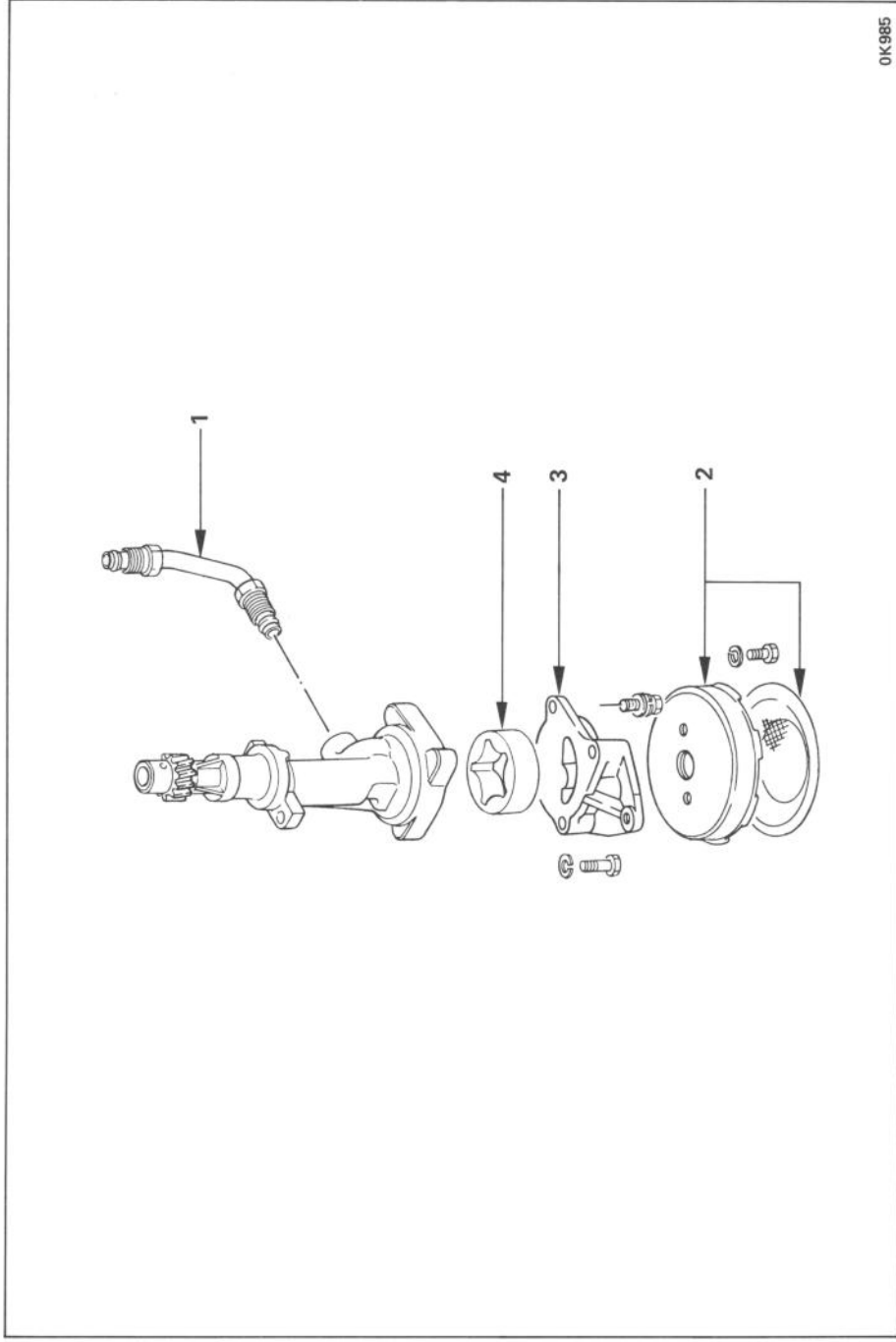


This illustration is based on gear type



DISASSEMBLY

Rotor type



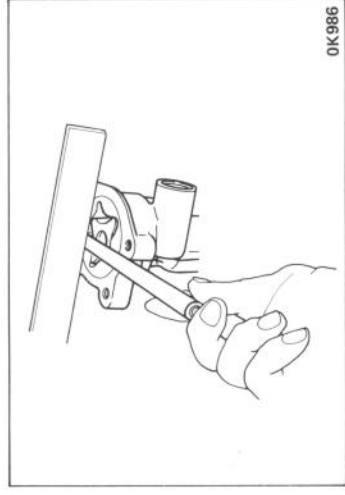
Disassembly steps

- 1. Oil pipe
- 2. Strainer
- 3. Pump cover
- 4. Vane

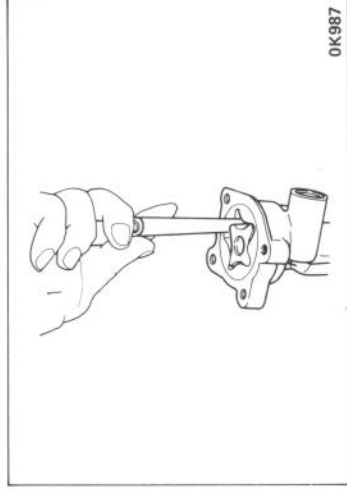


INSPECTION AND REPAIR

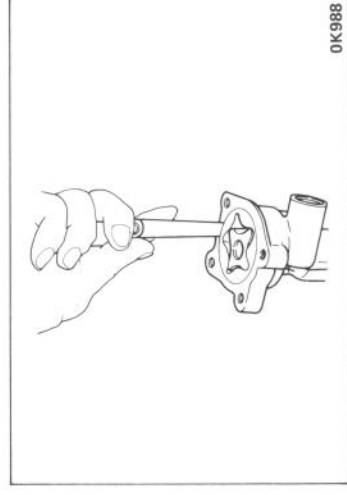
Make necessary correction or parts replacement if wear, damage or any other abnormal conditions are found through inspection.



Clearance between vane, and body.		(mm)
Standard		Limit
0.02 — 0.07		0.15



Clearance between rotor and vane.		(mm)
Standard		Limit
0.02 — 0.13		0.15

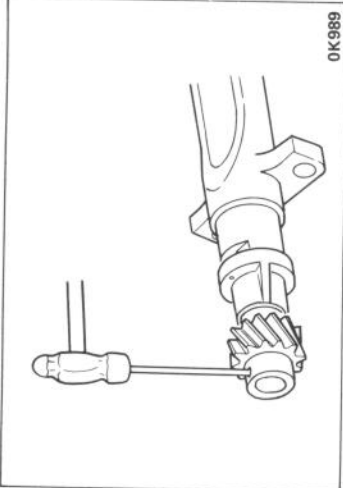


Clearance between vane and pump body.		(mm)
Standard		0.2 — 0.27



Clearance between rotor shaft and pump body.		(mm)
Standard		Limit
0.04		0.2

Pinion replacement



Removal

File off caulked end of the pinion stopper pin, then drive out the pin toward opposite side.

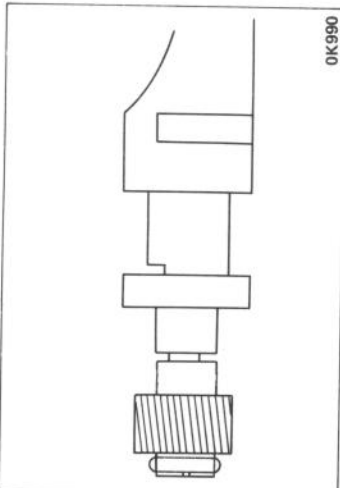


It is necessary to drill a hole in one side of the pinion for service as it does not have a hole on both sides.

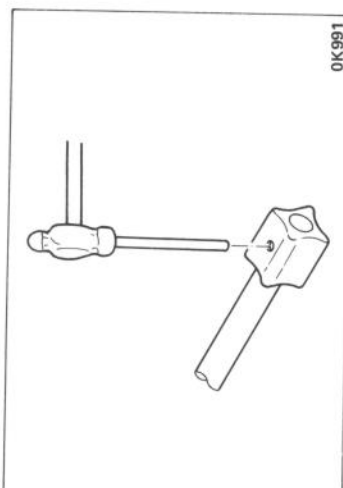


Installation

Install a new stopper pin and caulk end of pin after installation.

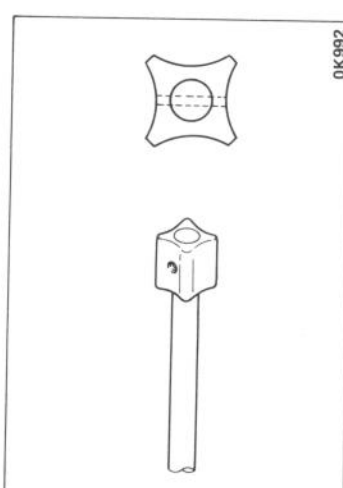


Rotor replacement



Removal

Drive out the pin from one side.



Installation

When the pin is installed, check to make certain end of the pin is not projected from the end of rotor.



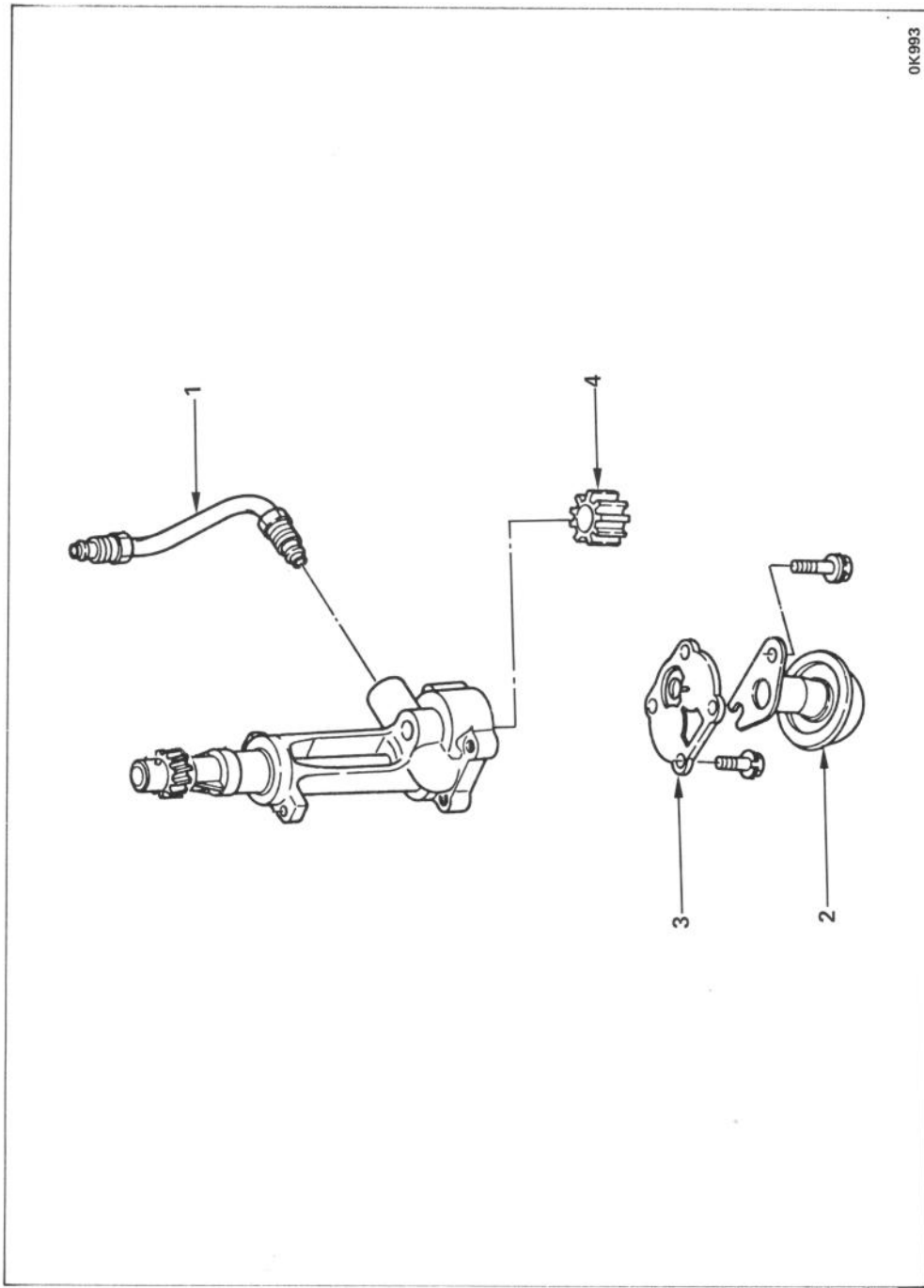
REASSEMBLY

To assemble, follow the disassembly procedure in reverse order.



DISASSEMBLY

Gear type



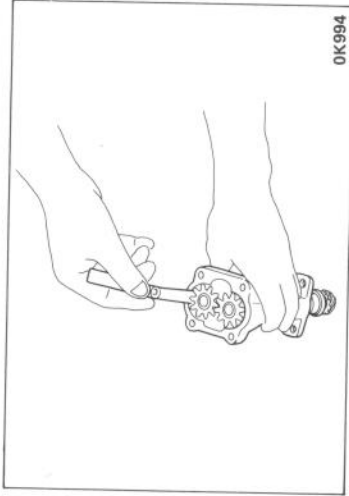
Disassembly steps

1. Oil pipe
2. Strainer
3. Cover
4. Driven gear



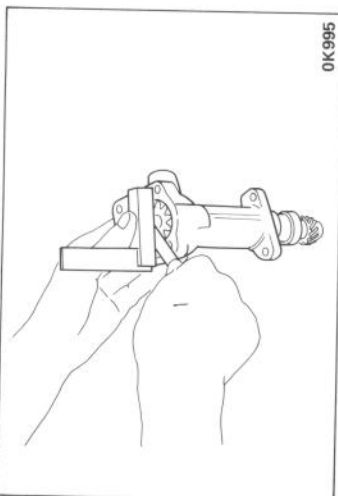
INSPECTION AND REPAIR

Make necessary correction or parts replacement if wear, damage or any other abnormal conditions are found through inspection.



Clearance between gear teeth and body inner wall.

Standard	Limit
0.12 — 0.13	0.15



Clearance between body and gear.

Standard	Limit
0.04 — 0.09	0.10



REASSEMBLY

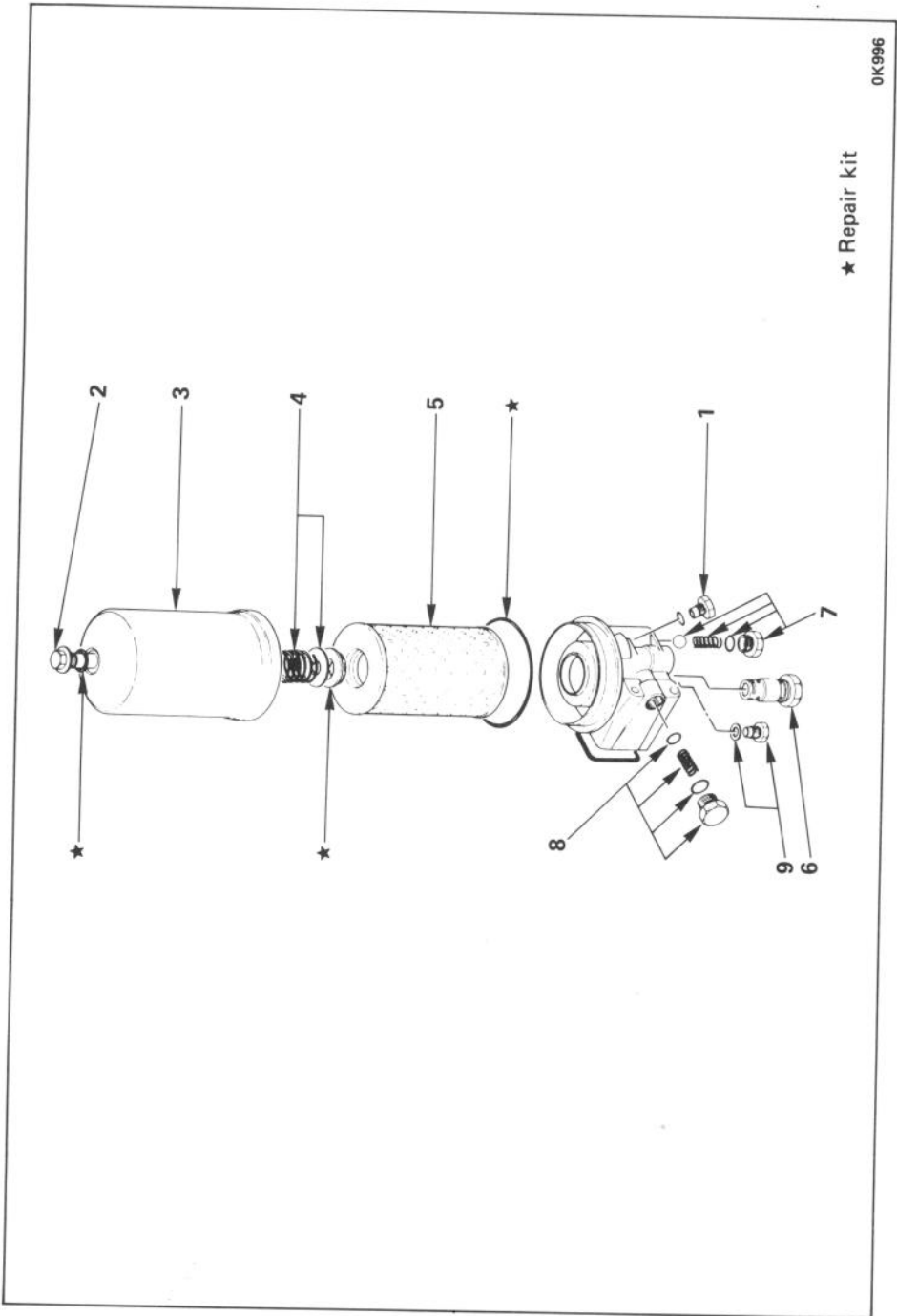
To assemble, follow the disassembly procedure in reverse order.

OIL FILTER



DISASSEMBLY

C240 model



Disassembly steps

1. Drain plug
2. Center bolt
3. Cover
4. Spring, seat and gasket
5. Element

6. Relief valve assembly
7. Overflow valve assembly
8. Oil cooler relief valve (Model with oil cooler)
9. Plug and O-ring (Model without oil cooler)



INSPECTION AND REPAIR

Make necessary correction or parts replacement if damage or any other abnormal conditions are found through inspection.



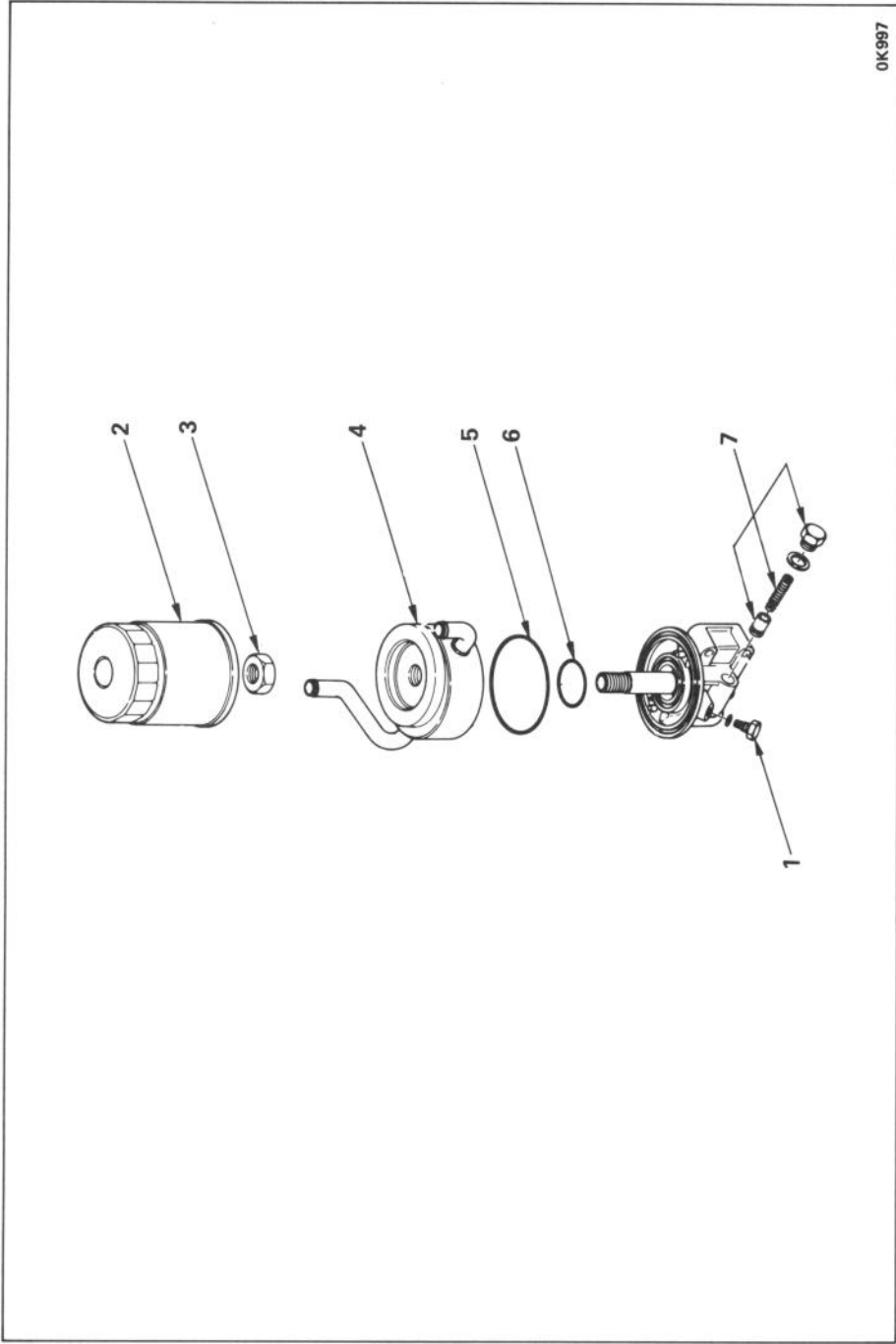
REASSEMBLY

To assemble, follow the disassembly procedure in reverse order.

WITH OIL COOLER TYPE



DISASSEMBLY



Disassembly

1. Drain plug
2. Cartridge oil filter
3. Nut
4. Oil cooler
5. O-ring
6. O-ring
7. Oil cooler relief valve assembly

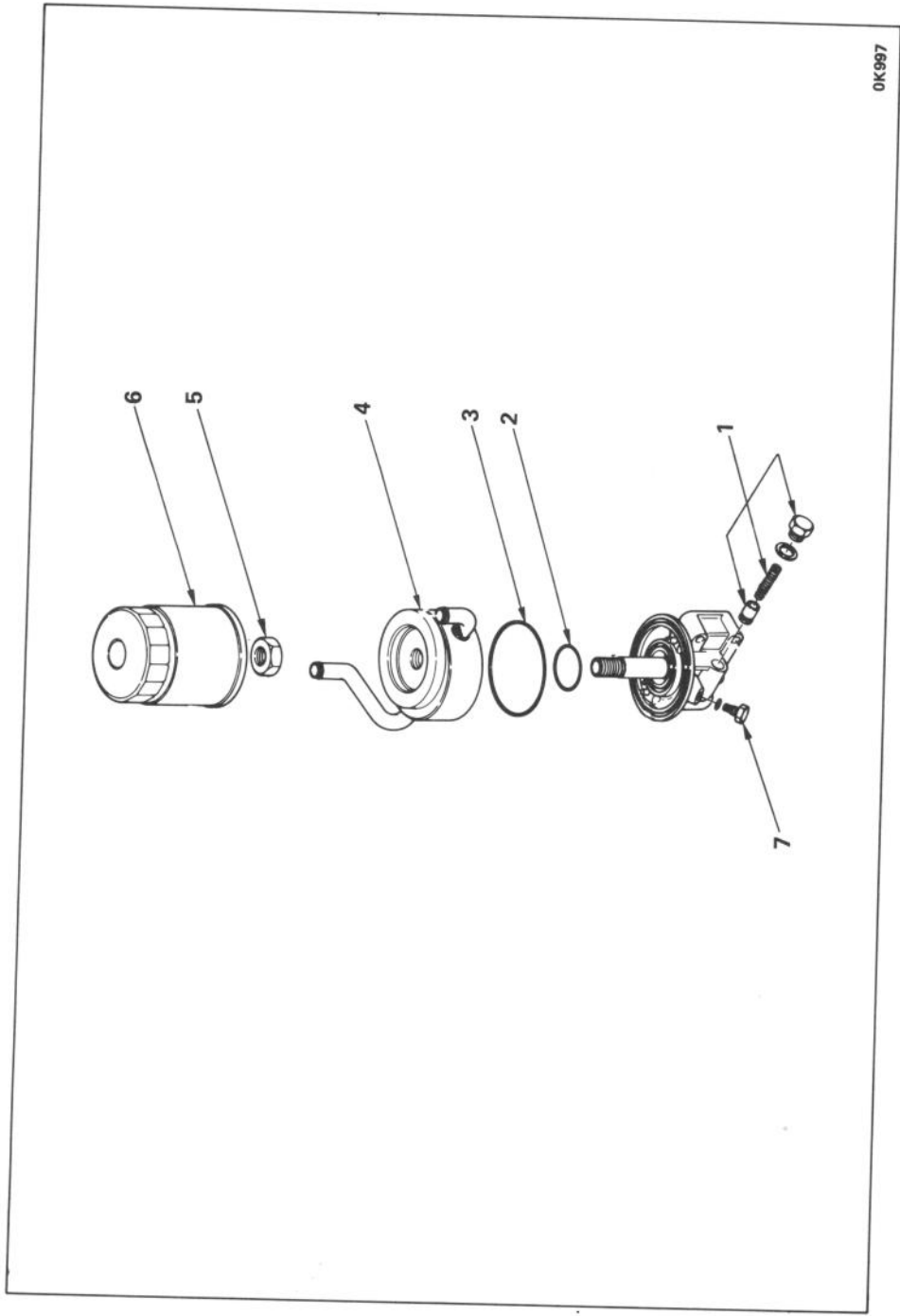


INSPECTION AND REPAIR

Make necessary correction or parts replacement if damage or any other abnormal conditions are found through inspection.



REASSEMBLY



Reassembly steps

1. Oil cooler relief valve assembly
2. O-ring
3. O-ring
4. Oil cooler
5. Nut
6. Cartridge oil filter
7. Drain plug



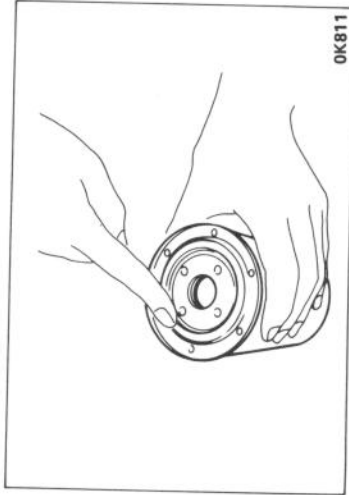
Important operations

5. Nut

Torque	(kg-m)	2.5 — 3.5
--------	--------	-----------

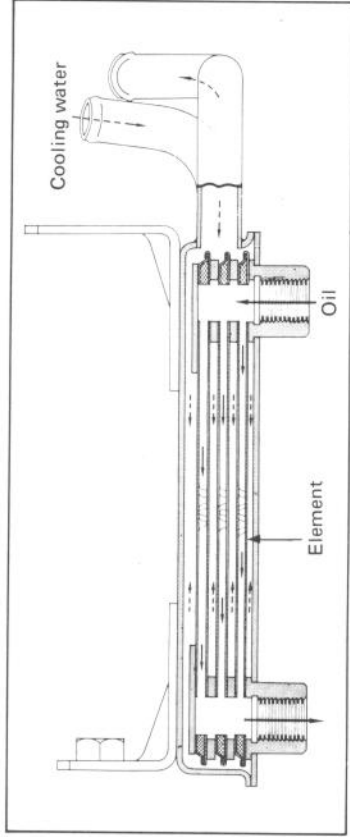
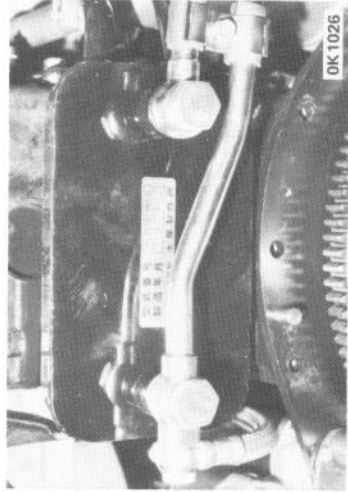
6. Cartridge oil filter

Apply engine oil to O-ring.  
Turn in filter until sealing face is brought into connect with the O-ring. Further tighten 2/3 of a turn.



OIL COOLER

C240 type



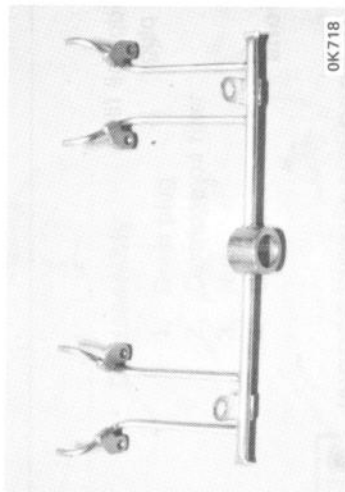
INSPECTION AND REPAIR

Make necessary correction or parts replacement if damage or any other abnormal conditions are found through inspection.

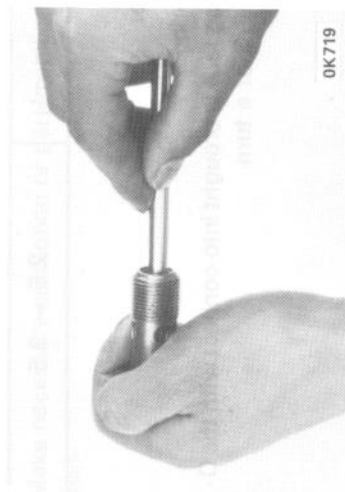
OIL JET PIPE AND REGULATION VALVE

INSPECTION AND REPAIR

Make necessary correction or parts replacement if wear, damage or any other abnormal conditions are found through inspection.



Visual check  
Inspection for damage or other abnormal conditions.



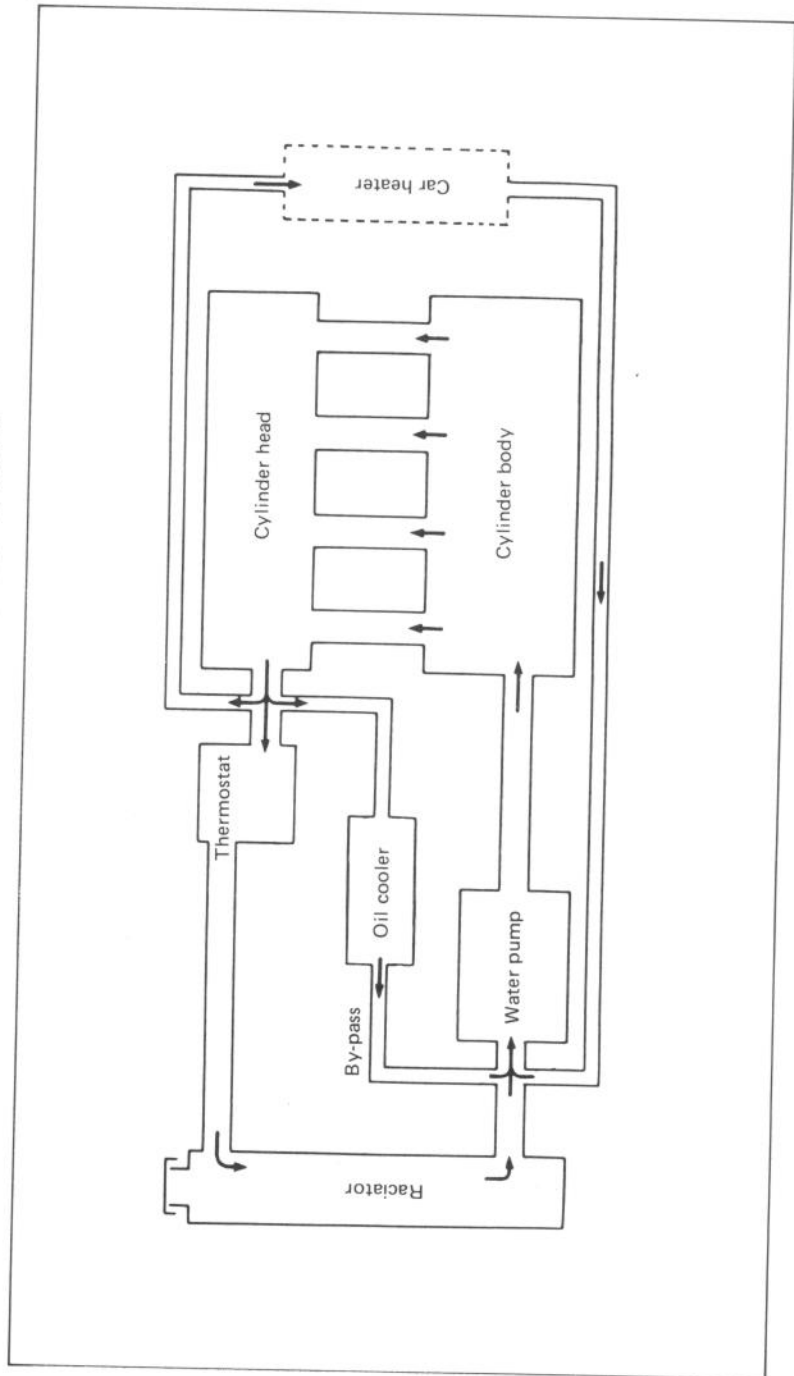
Apply a light pressure onto the valve with a screw driver and check that valve operates smoothly.

SECTION 4  
COOLING SYSTEM

INDEX

CONTENTS	PAGE
General description .....	4-1
Water pump .....	4-2
Thermostat .....	4-6

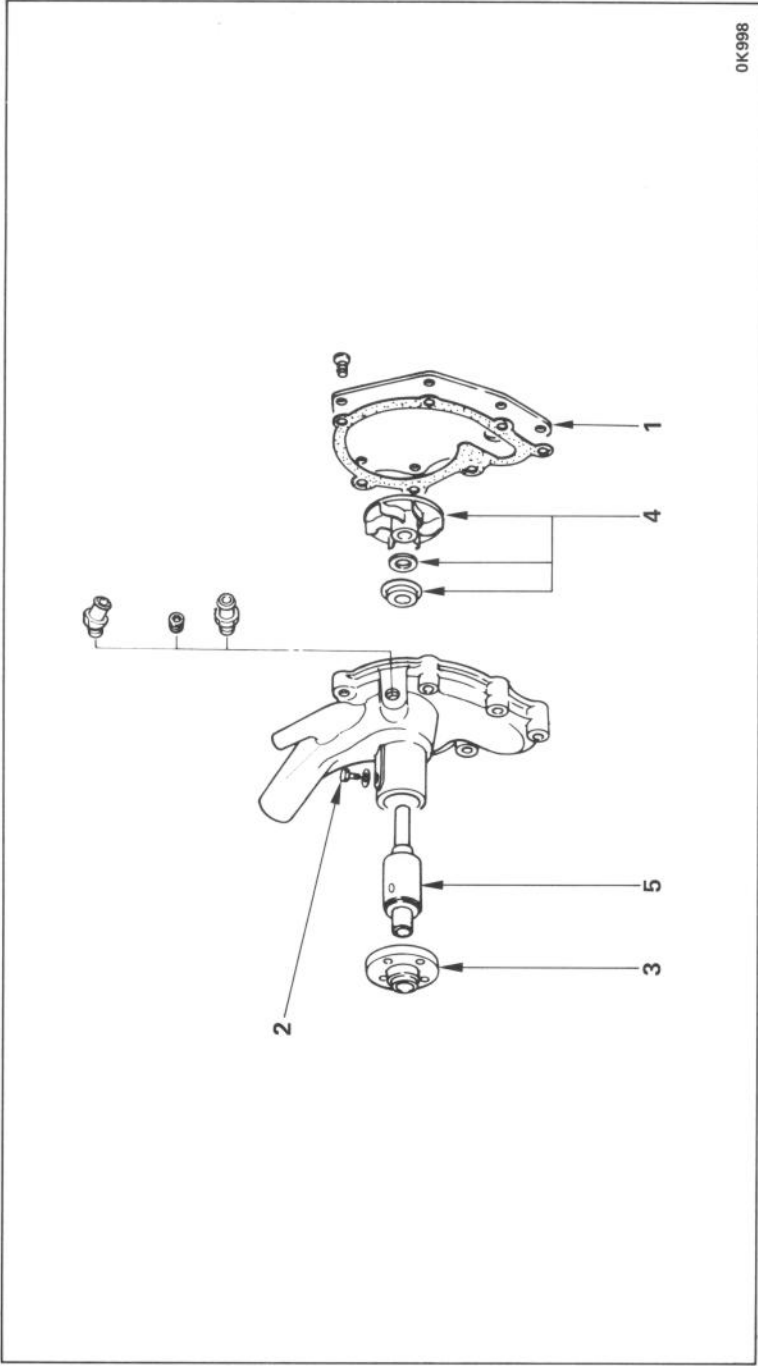
GENERAL DESCRIPTION





# WATER PUMP

## DISASSEMBLY



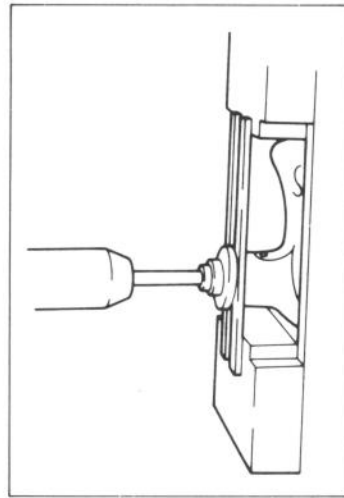
### Disassembly steps

1. Cover
2. Set screw
- ▲ 3. Fan center
- ▲ 4. Impeller and seal unit
5. Bearing unit



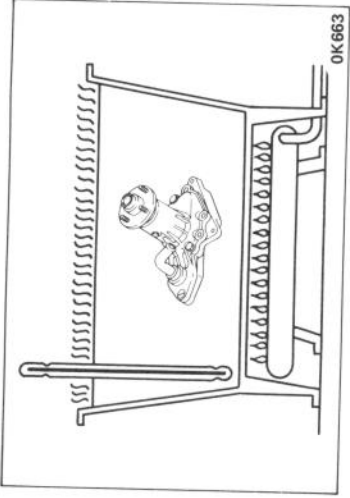
### Important operation

3. Fan center  
Remover.

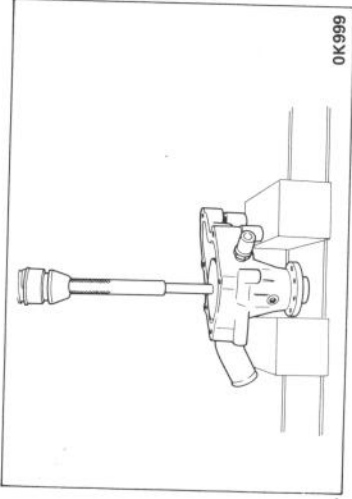


## 4. Impeller and seal unit

For aluminum body only.  
Heat the pump body in hot water (80 ~ 90°C).

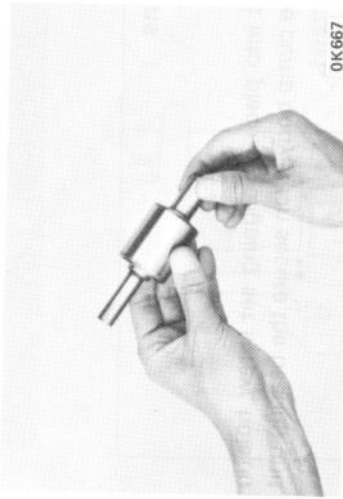


Remove impeller using a bench press and a suitable bar.



## INSPECTION AND REPAIR

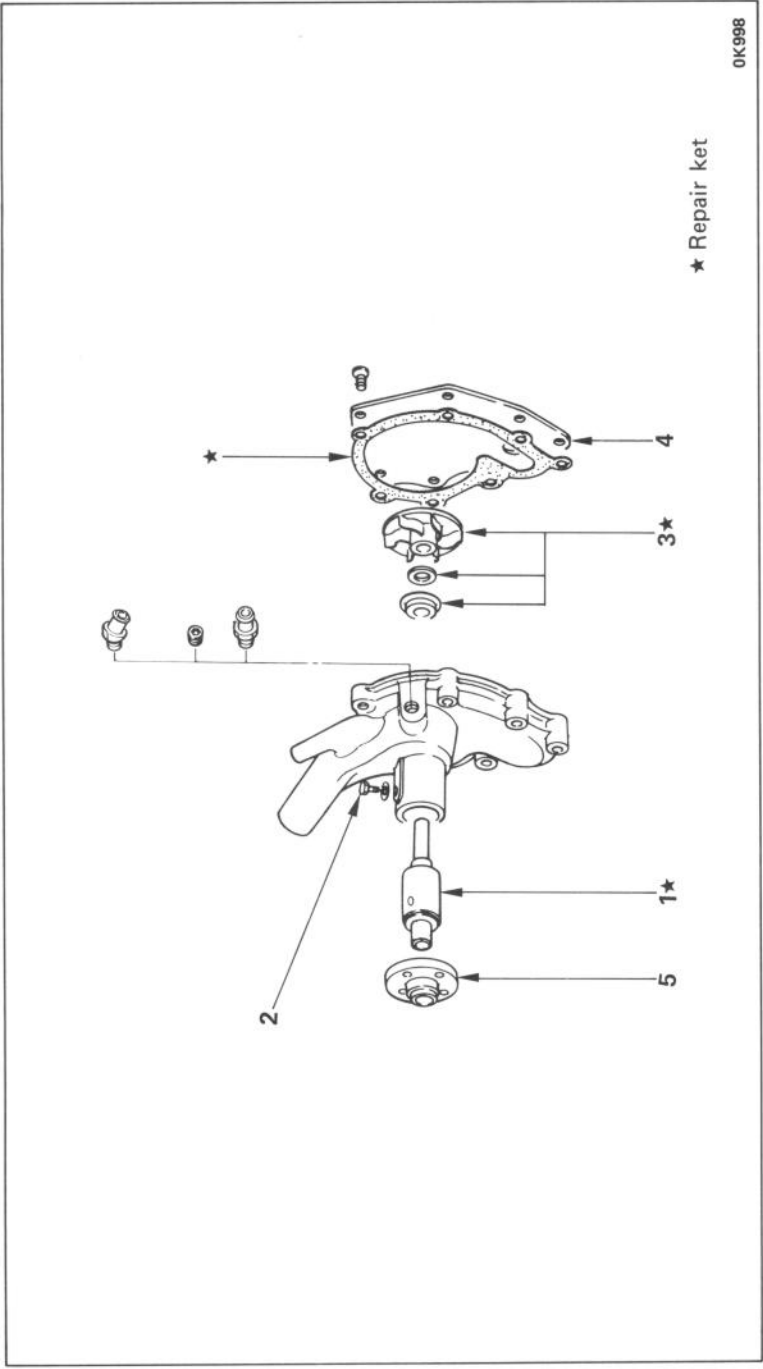
Make necessary correction or parts replacement if wear, damage or any other abnormal condition are found through inspection.



Check the bearing for abnormal noise, binding and other abnormal conditions.



REASSEMBLY



Reassembly steps

- ▲ 1. Bearing unit
- 2. Set screw
- ▲ 3. Impeller and seal unit

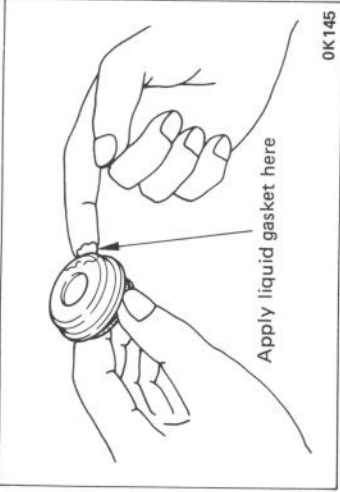
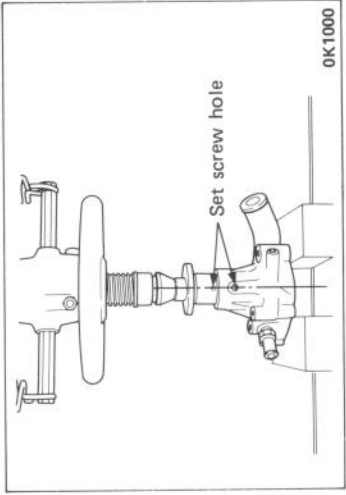
- 4. Cover
- ▲ 5. Fan center



Important operations

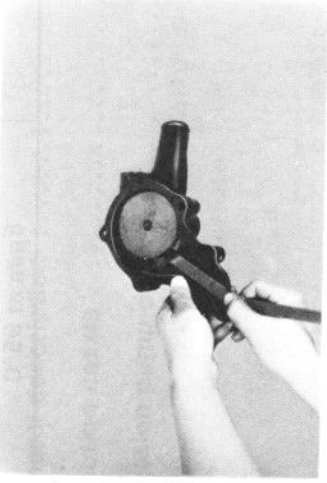
1. Bearing unit

Press the bearing unit into place by aligning set screw hole in bearing with that in the pump body, then secure the bearing unit in position with the screws.



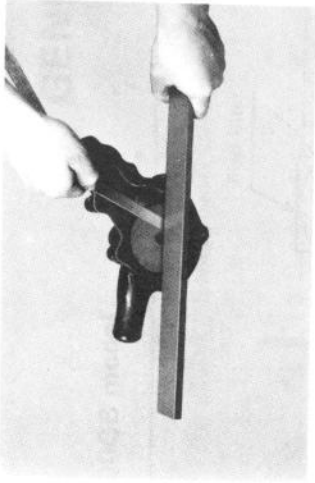
3. Impeller and seal unit

Apply a thin coat of liquid gasket; BELCO BOND No.4 to the outer periphery of seal unit before installing the seal unit.



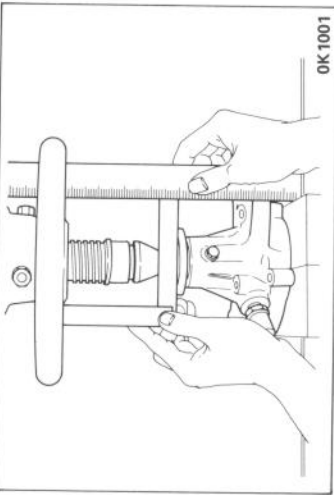
Install the impeller in position using bench press, so that the specified clearance is provided between the impeller and pump body.

Clearance	(mm)
	0.3 — 0.6



After installation, check that rear face of the impeller is indented from the face of the pump body.

Depth	(mm)
	1



5. Fan center

Distance between fan fitting face and rear face of the rear cover.

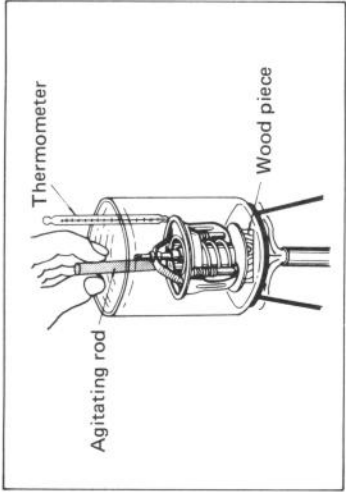
Distance	(mm)
	110.7 — 111.3



THERMOSTAT

INSPECTION AND REPAIR

Make necessary correction or parts replacement if wear, damage or any other abnormal conditions are found through inspection.



Valve opening temperature	Valve lift at testing temperature
82°C	8mm at 95°C

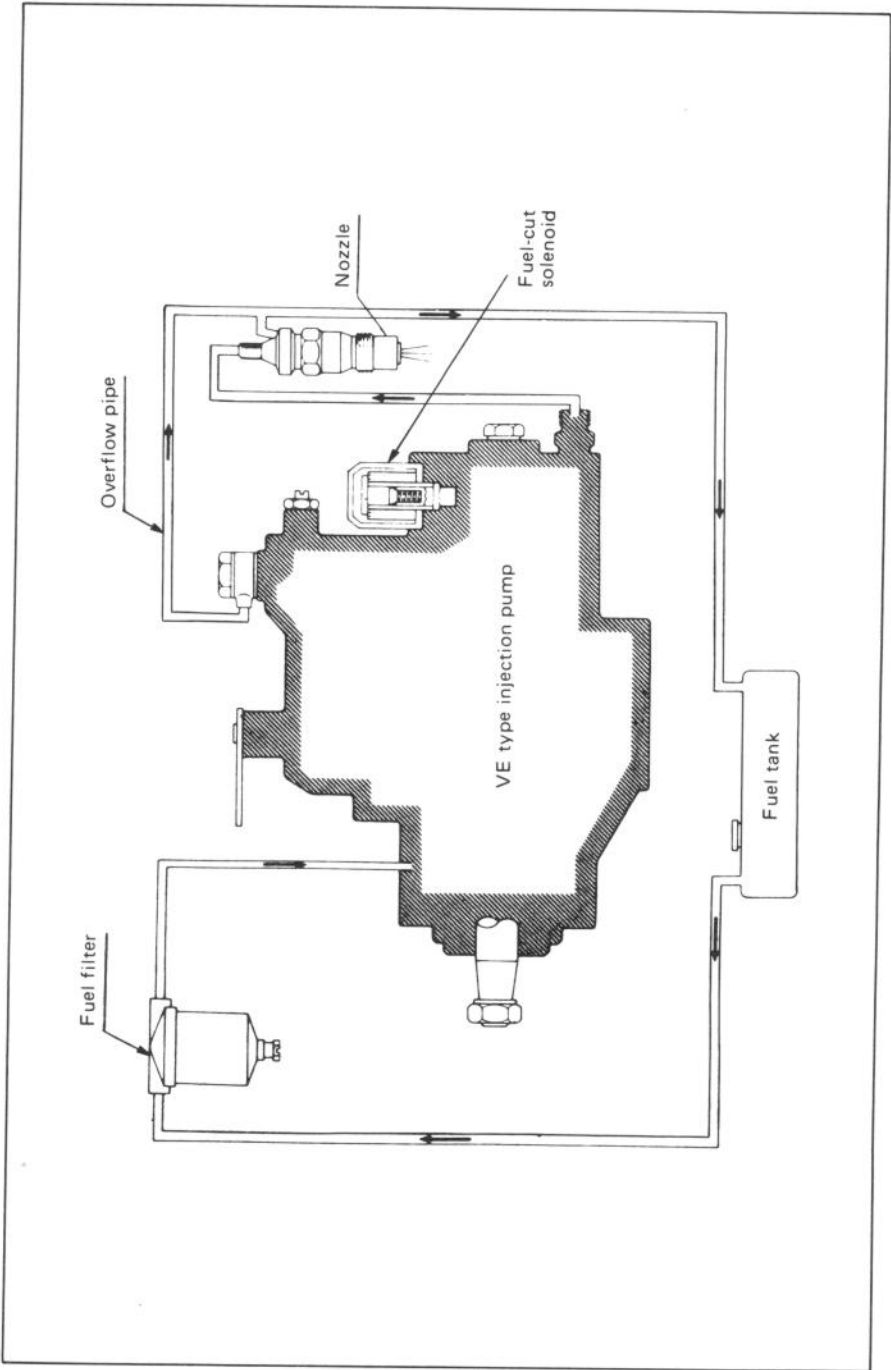
SECTION 5  
FUEL SYSTEM

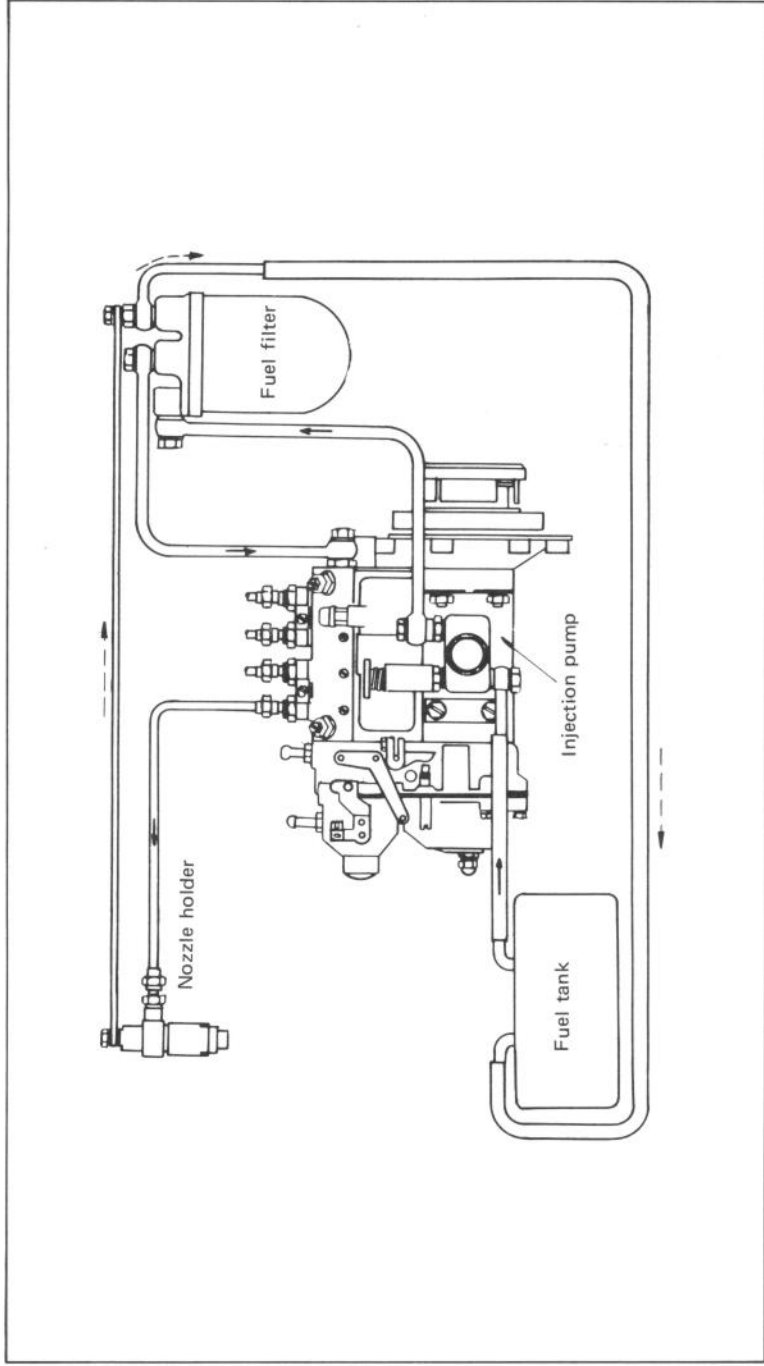
INDEX

CONTENTS	PAGE
General description .....	5-1
Injection nozzle .....	5-3
Injection pump data .....	5-4

GENERAL DESCRIPTION

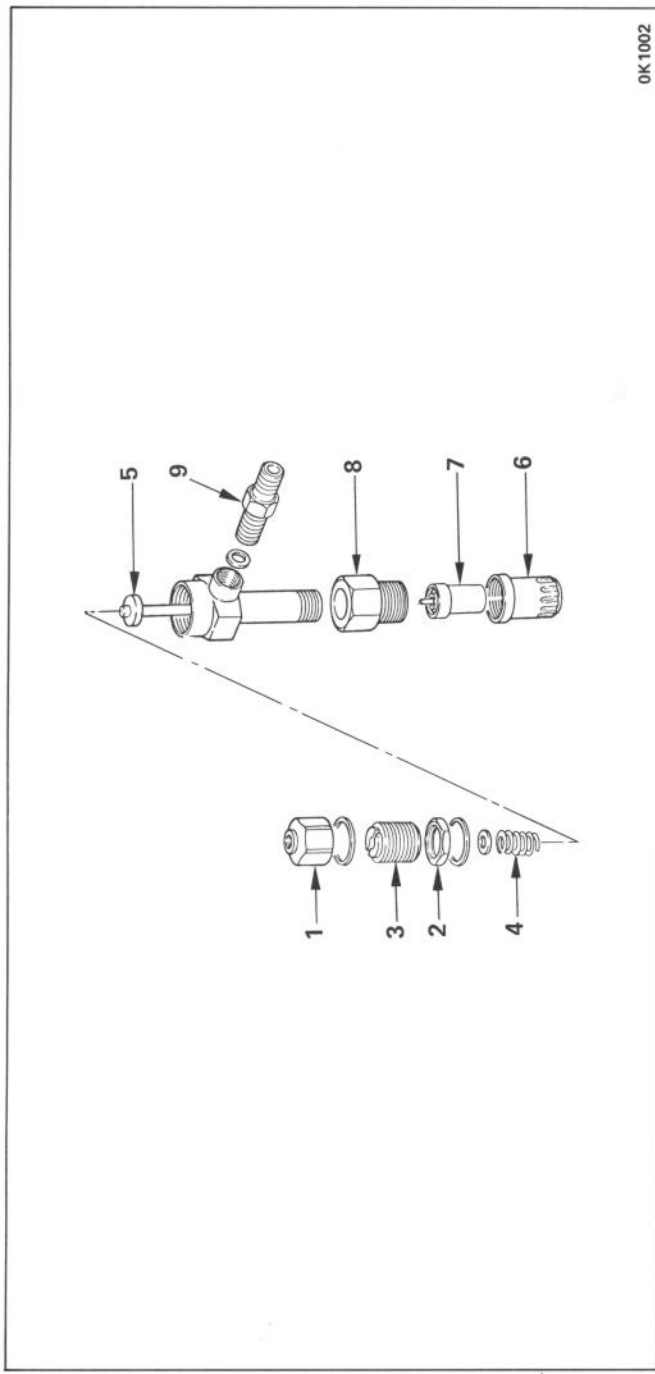
C190GB model





## INJECTION NOZZLE

### DISASSEMBLY



#### Disassembly steps

1. Screw cap nut
2. Nut
3. Adjusting screw
4. Nozzle spring
5. Push rod

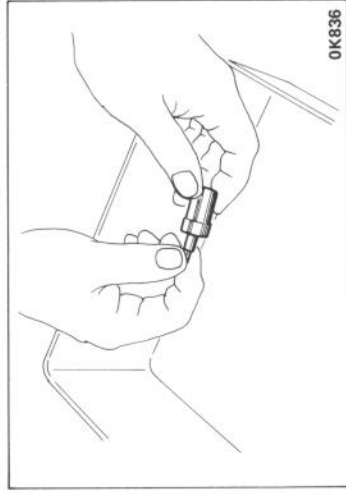
6. Nozzle nut
7. Nozzle
8. Nozzle holder screw
9. Connector
10. Edge filter



#### Important operation

##### 7. Nozzle

After removal of nozzle assembly from the nozzle body, keep them separate to maintain proper needle valve to body combinations.



OK836

### REASSEMBLY

To reassemble, follow the disassembly procedure in reverse order. Refer to "FUEL SYSTEM" in section 1 "General information" on page 1 — 19 for injection of spraying condition and injection starting pressure adjustment.

INJECTION PUMP DATA  
(C190GB, C190KE models)

INJECTION VOLUME ADJUSTMENT  
TEST CONDITIONS

Injection nozzle	★ D.K.K.C. P.No.105780-0000 Bosch type No.DN12SD12T
Injection nozzle holder	D.K.K.C. P.No.105780-2080 Bosch type No.EF8511/9A
Injection starting pressure	150kg/cm <sup>2</sup>
Injection line	Inner dia. 2mm x Outer dia. 6mm — Length 840mm
Transfer pump pressure	0.2kg/cm <sup>2</sup>
Test diesel fuel	Bosch oil OL61V11 SAE standard test oil (SAE 967.C)
Testing oil temperature	46 — 54°C
Identification number	104749—1020, 104749—1030

★ D.K.K.C. .... Diesel Kiki Co., Ltd.

IDENTIFICATION PLATE AND NUMBER

When adjusting injection volume, use the correct data following the injection pump identification number.

MAKER'S  
ASS'Y NO. 894225 2471

INJ. PUMP  
ASS'Y NO. 104748-1010

INJECTION VOLUME AND GOVERNOR PERFORMANCE DIAGRAM

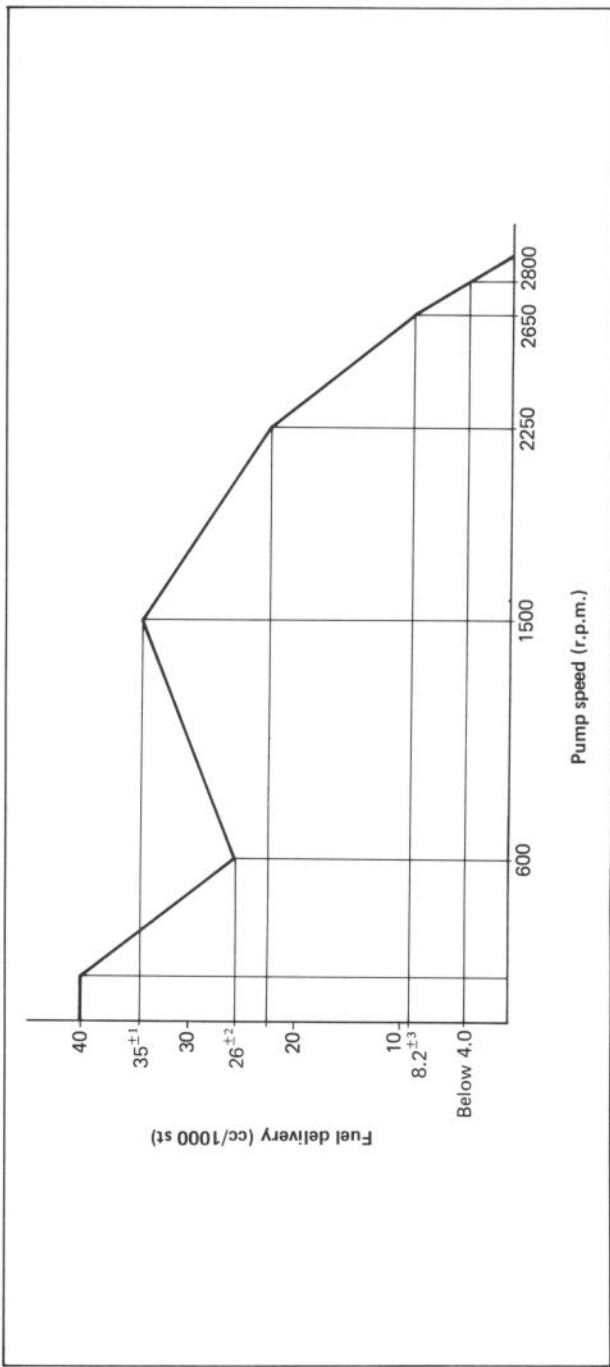
Identification number : 104749—1030

Test diesel fuel : Bosch diesel fuel OL61V11

1. Settings		Pump Speed (rpm)	Fuel delivery (cc/1000st.)
1.1	Idle speed regulation	315	4.7—8.7
1.2	Start	100	Above 58
2. Test Specifications			
2.1	Timing device	N = rpm mm	1000 0.9—21
2.2	Supply pump	N = rpm kg/cm <sup>2</sup>	1500 3.6—4.2
		1000 3.9—4.5	2300 7.0—7.8
	Overflow delivery	N = rpm cc/10s	1500 5.3—5.7
		1000 48—91	2150 6.6—7.2
2.3 Fuel deliveries			
Speed control lever	Pump speed (rpm)	Fuel delivery (cc/1000st.)	
End stop	1500	34.6—36.6	
	600	24.4—28.4	
	2225	30.3—34.3	
	2650	5.2—11.2	
	2800	Below 4.1	
Switch-off	315	0	
Idle stop	315	4.7—8.7	
	365	Below 3.6	
Cold start device	0	1.9—2.3mm Cancel	
	560—760	8V	
2.4 Solenoid	Max. cut-in voltage test voltage	12V—14V	
3. Dimensions		Designation	For assembly and adjustment (mm)
		K	3.2—3.4
		KF	5.7—5.9
		MS	1.7—1.9
		α	21—29 deg.
		A	7.5—11 mm
		β	36—46 deg.
		B	10.5—14.6 mm
		Observations	

N : Pump speed

GOVERNOR PERFORMANCE DIAGRAM



INJECTION VOLUME AND GOVERNOR PERFORMANCE DIAGRAM

Identification number : 104749-1030

Test diesel fuel : SAE standard test diesel fuel SAE967C

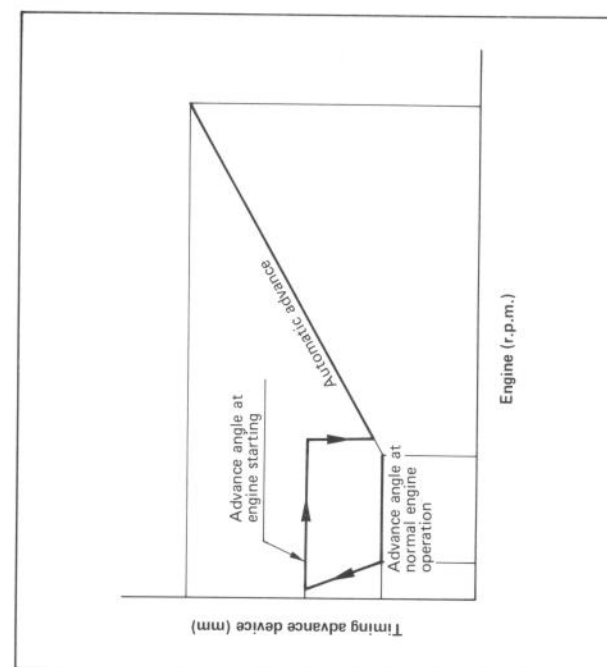
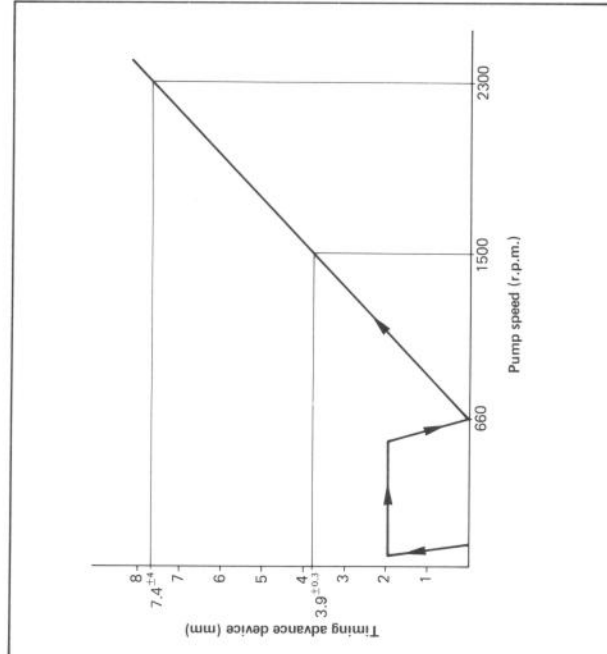
1. Settings	Pump Speed (rpm)	Fuel delivery (cc/1000st.)
1.1 Idle speed regulation	315	4.5-8.5
1.2 Start	100	Above 57

2. Test Specifications		
2.1 Timing device	N = rpm mm	1000 0.9-2.1 2300 3.5-4.1 6.9-7.8
2.2 Supply pump	N = rpm kg/cm <sup>2</sup>	1000 3.8-4.4 2150 5.2-5.6 6.5-7.1
Overflow delivery	N = rpm cc/10s	1000 52-95

2.3 Fuel deliveries		
Speed control lever	Pump speed (rpm)	Fuel delivery (cc/1000st.)
End stop	1500 600 2225 2650 2800	33.7-35.7 23.8-27.8 29.5-33.5 5.0-11.0 Below 4
Switch-off	315	0
Idle stop	315 365	4.5-8.5 Below 3.5
Cold start device	0 600-800	1.9-2.3mm Cancel
2.4 Solenoid	Max. cut-in voltage test voltage	12V

N : Pump speed

TIMING DEVICE DIAGRAM



INJECTION VOLUME AND GOVERNOR PERFORMANCE DIAGRAM

Identification number : 104749-1020

Test diesel fuel : Bosch diesel fuel OL61V11

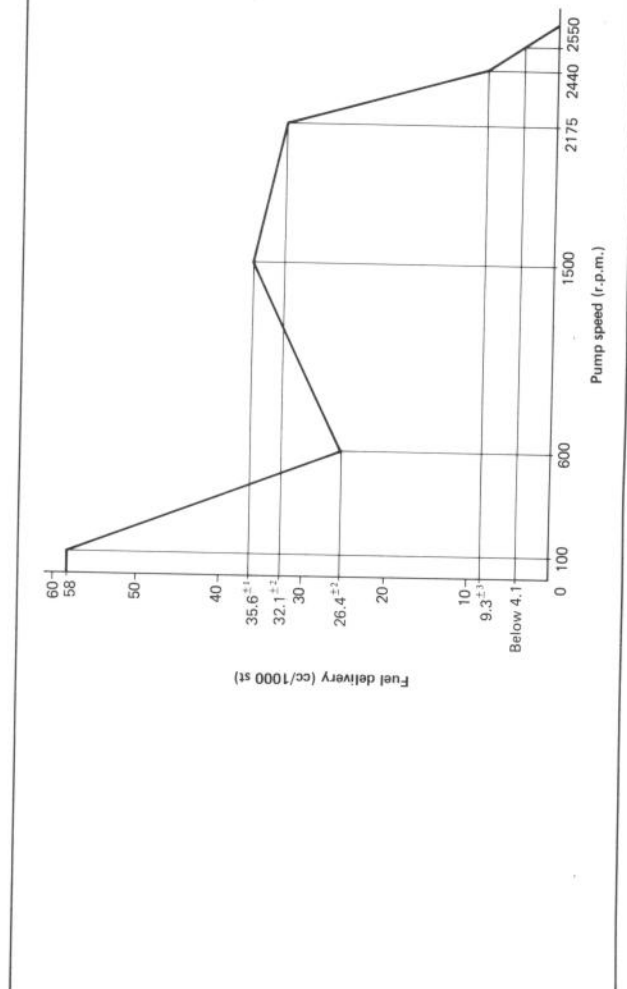
1. Settings	Pump Speed (rpm)	Fuel delivery (cc/1000st.)
1.1 Idle speed regulation	315	4.7-8.7
1.2 Start	100	Above 58

2. Test Specifications		
2.1 Timing device	N = rpm mm	1000 0.9-2.1 2300 3.6-4.2 7.0-7.8
2.2 Supply pump	N = rpm kg/cm <sup>2</sup>	1000 3.9-4.5 2150 5.3-5.7 6.6-7.2
Overflow delivery	N = rpm cc/10s	1000 48-91

2.3 Fuel deliveries		
Speed control lever	Pump speed (rpm)	Fuel delivery (cc/1000st.)
End stop	1500 600 2175 2440 2550	34.6-36.6 24.4-28.4 30.1-34.1 6.3-12.3 Below 4.1
Switch-off	315	0
Idle stop	315 365	4.7-8.7 Below 3.6
Cold start device	0 560-760	1.9-2.3mm Cancel
2.4 Solenoid	Max. cut-in voltage test voltage	12-14V

N : Pump speed

GOVERNOR PERFORMANCE DIAGRAM



INJECTION VOLUME AND GOVERNOR PERFORMANCE DIAGRAM

Identification number : 104749-1020

Test diesel fuel : SAE standard test diesel fuel SAE987C

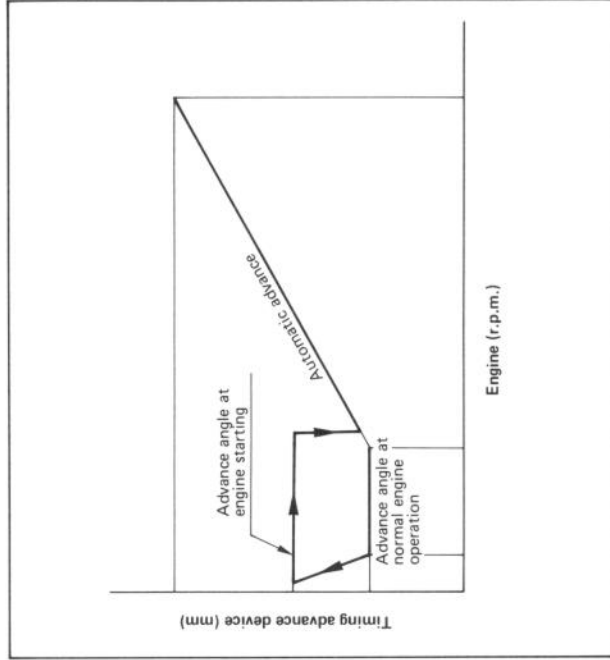
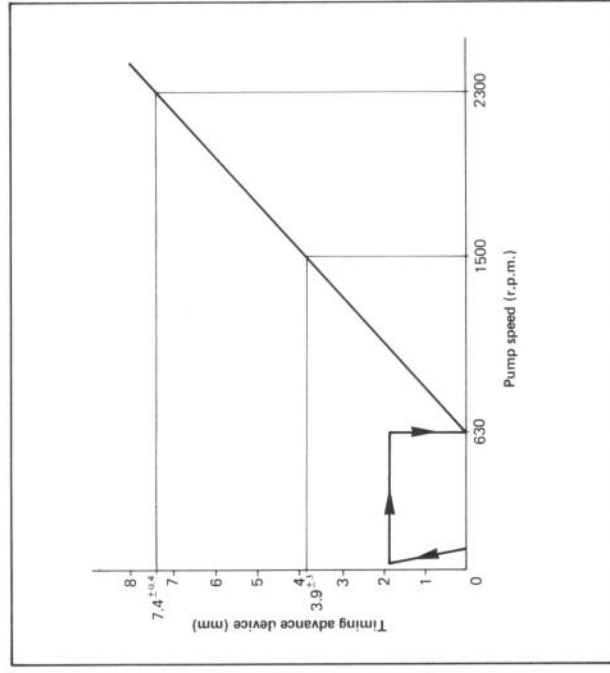
1. Settings	Pump Speed (rpm)	Fuel delivery (cc/1000st.)
1.1 Idle speed regulation	315	4.5-8.5
1.2 Start	100	Above 57

2. Test Specifications	N = rpm	1000	1500	2300
2.1 Timing device	mm	0.9-2.1	3.6-4.1	6.9-7.8
2.2 Supply pump	N = rpm kg/cm <sup>2</sup>	1000 3.8-4.4	1500 5.2-5.6	2150 6.5-7.1
Overflow delivery	N = rpm cc/10s	1000 52-95		

2.3 Fuel deliveries	Pump speed (rpm)	Fuel delivery (cc/1000st.)
Speed control lever		
End stop	1500 600 2175 2440 2550	33.7-35.7 23.8-27.8 29.3-33.3 6.1-12.1 Below 4
Switch-off	315	0
Idle stop	315 365	4.5-8.5 Below 3.5
Cold start device	0 600-800	1.9-2.3mm Cancel
2.4 Solenoid	Max. cut-in voltage test voltage	12V

N : Pump speed

TIMING DEVICE DIAGRAM



INJECTION PUMP DATA  
(C190, C240 models)

INJECTION VOLUME ADJUSTMENT

TEST CONDITIONS

Injection nozzle	★ D.K.K.C. P.No.105780-0000 Bosch type No.DN12SD12T
Injection nozzle holder	D.K.K.C. P.No.105780-2080 Bosch type No.EF8511/9A
Injection starting pressure	175kg/cm <sup>2</sup>
Injection line	Inner dia. 2mm x Outer dia. 6mm — Length 600mm
Transfer pump pressure	1.6kg/cm <sup>2</sup>
Test diesel fuel	Bosch oil OL61V11 (Shell V-oil 1253) SAE standard test oil (SAE 967C)
Testing oil temperature	40 — 45°C
Identification number	C190 C240

★ D.K.K.C. .... Diesel Kiki Co., Ltd.

IDENTIFICATIONS PLATE AND NUMBER



The injection volume should be adjusted by referring to the adjustment data applicable to the specific injection pump model as identified by ①.



INJECTION VOLUME AND GOVERNOR PERFORMANCE DIAGRAM

Identification No. : 101421-4980, 101421-7027

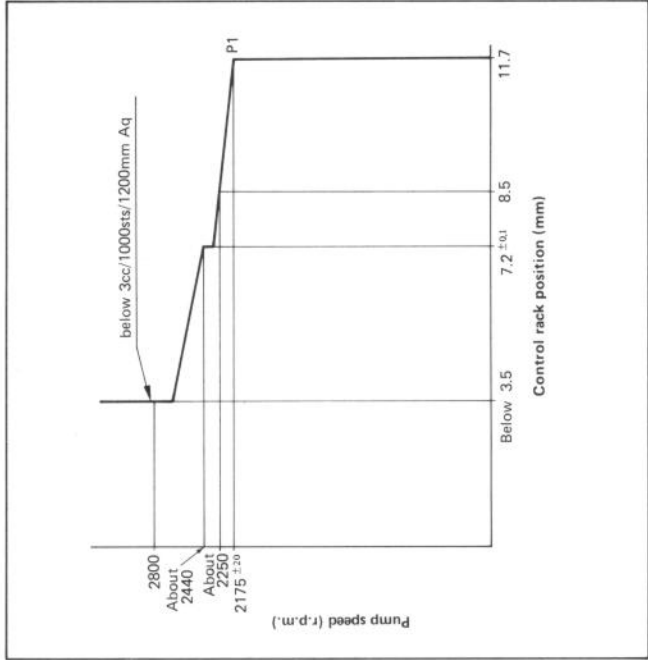
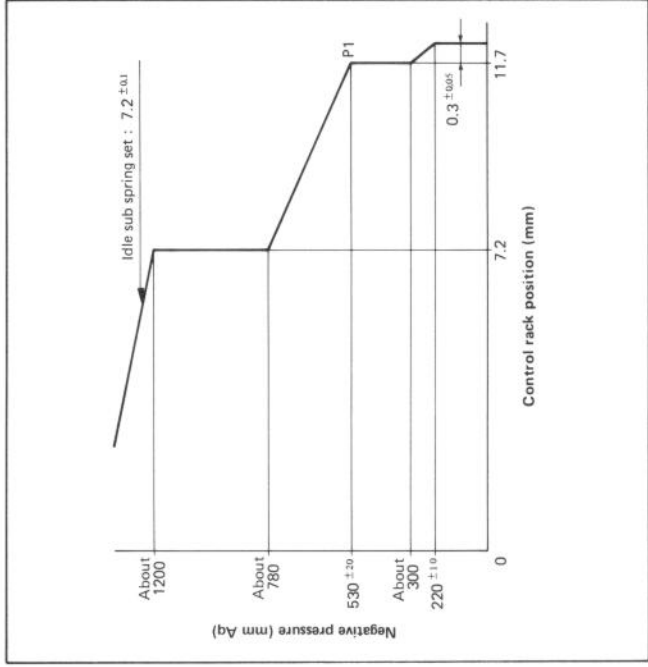
Bosch oil OL61V11

Control rack position (mm)	Pump speed (rpm)	Injection volume (cc/1000st.)	Deviation (%)	Remarks
11.7	1800	37.6-39.4	± 2.5	Basic
About 7.2	300	6.8-9.0	± 14	
	150	Above -54	-	

SAE standard test oil

Control rack position (mm)	Pump speed (rpm)	Injection volume (cc/1000st.)	Deviation (%)	Remarks
11.7	1800	36.1-37.9	± 2.5	Basic
About 7.2	300	5.9-8.1	± 14	
	150	Above -52	-	

GOVERNOR PERFORMANCE DIAGRAM



INJECTION VOLUME AND GOVERNOR PERFORMANCE DIAGRAM

Identification No. : 101421-4870

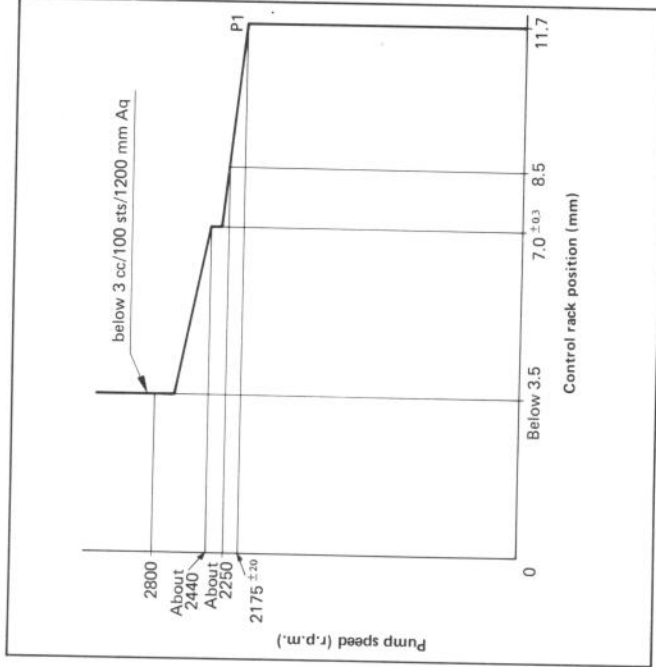
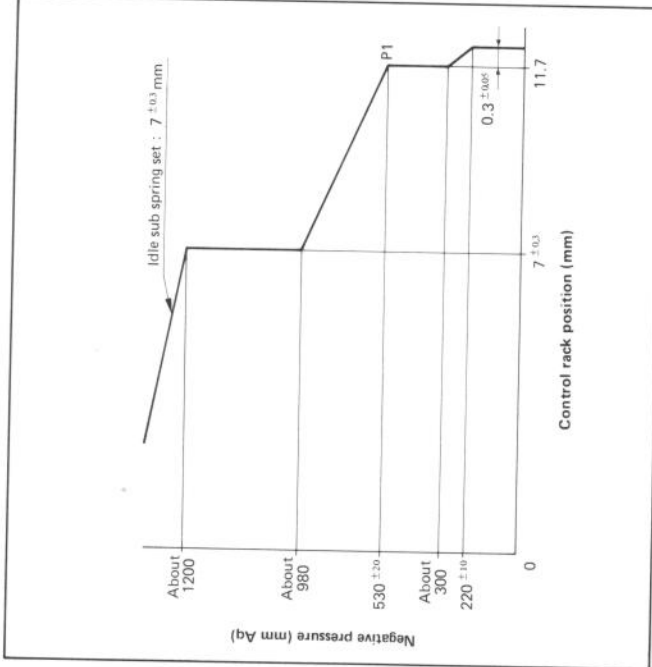
Bosch oil OL61V11

Control rack position (mm)	Pump speed (rpm)	Injection volume (cc/1000st.)	Deviation (%)	Remarks
11.7	1800	37.6-39.4	± 2.5	Basic
About 7.2	300	6.8-9.0	± 14	
	150	Above -54	-	

SAE standard test oil

Control rack position (mm)	Pump speed (rpm)	Injection volume (cc/1000st.)	Deviation (%)	Remarks
11.7	1800	36.1-37.9	± 2.5	Basic
About 7.2	300	5.9-8.1	± 14	
	150	Above -54	-	

GOVERNOR PERFORMANCE DIAGRAM





INJECTION VOLUME AND GOVERNOR PERFORMANCE DIAGRAM

Identification No. : 101431-0550

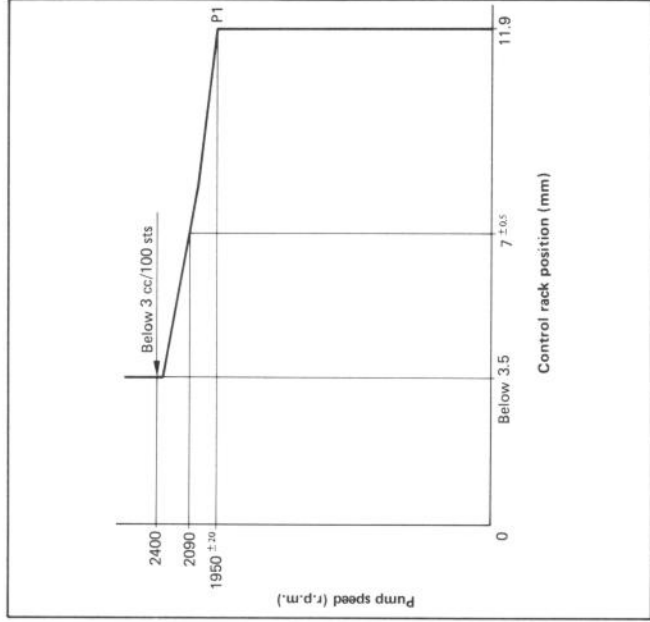
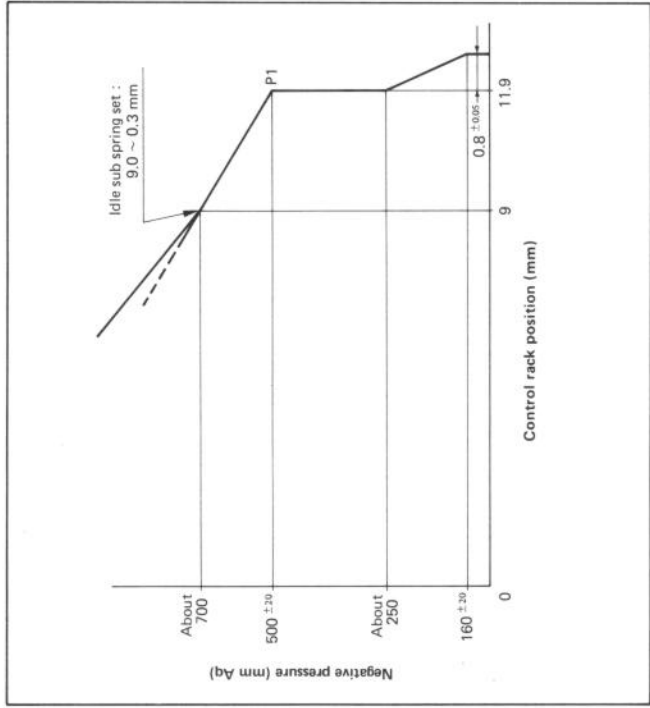
Bosch oil OL61V11

Control rack position (mm)	Pump speed (rpm)	Injection volume (cc/1000st.)	Deviation (%)	Remarks
11.9	1900	42.7-44.7	± 2.5	Basic
8.4	300	7.9-10.1	± 14	

SAE standard test oil

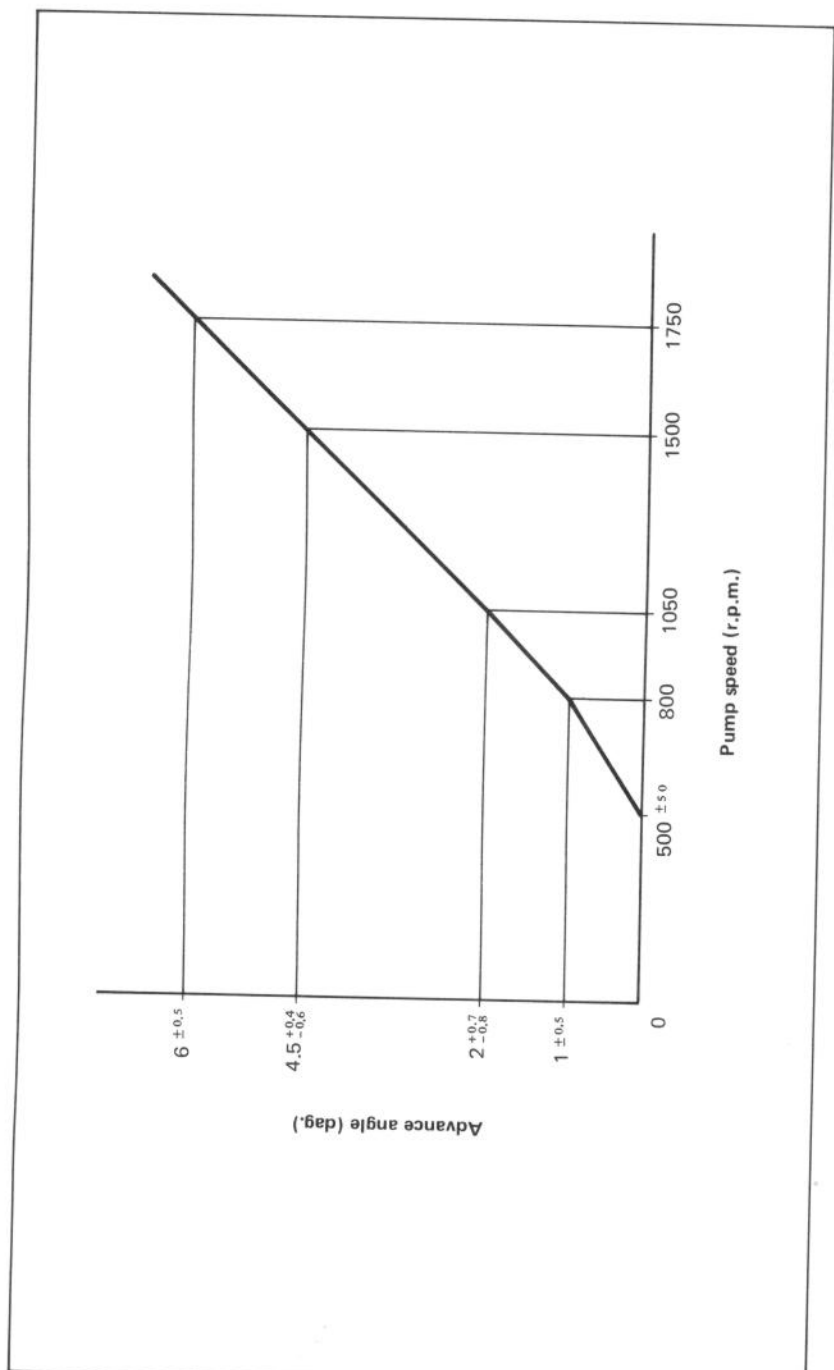
Control rack position (mm)	Pump speed (rpm)	Injection volume (cc/1000st.)	Deviation (%)	Remarks
11.9	1900	41.0-43.0	± 2.5	Basic
8.4	300	6.9-9.1	± 14	

GOVERNOR PERFORMANCE DIAGRAM

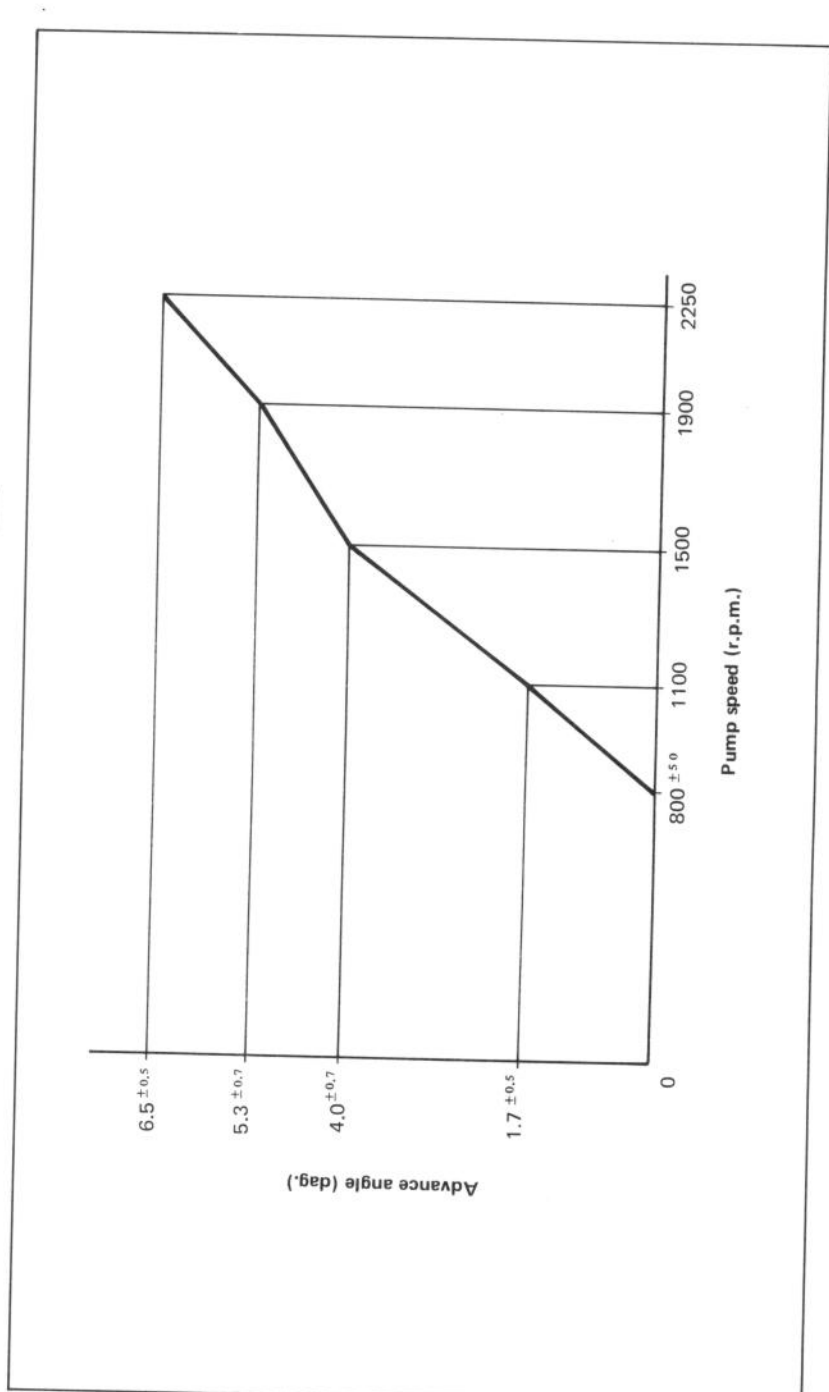


AUTOMATIC TIMER CHARACTERISTIC DIAGRAM

Identification No.: 101431-0550



Identification No.: 101421-7020, 101421-4870, 101421-7020



MEMO

SECTION 6

INTAKE AND EXHAUST SYSTEM

INDEX

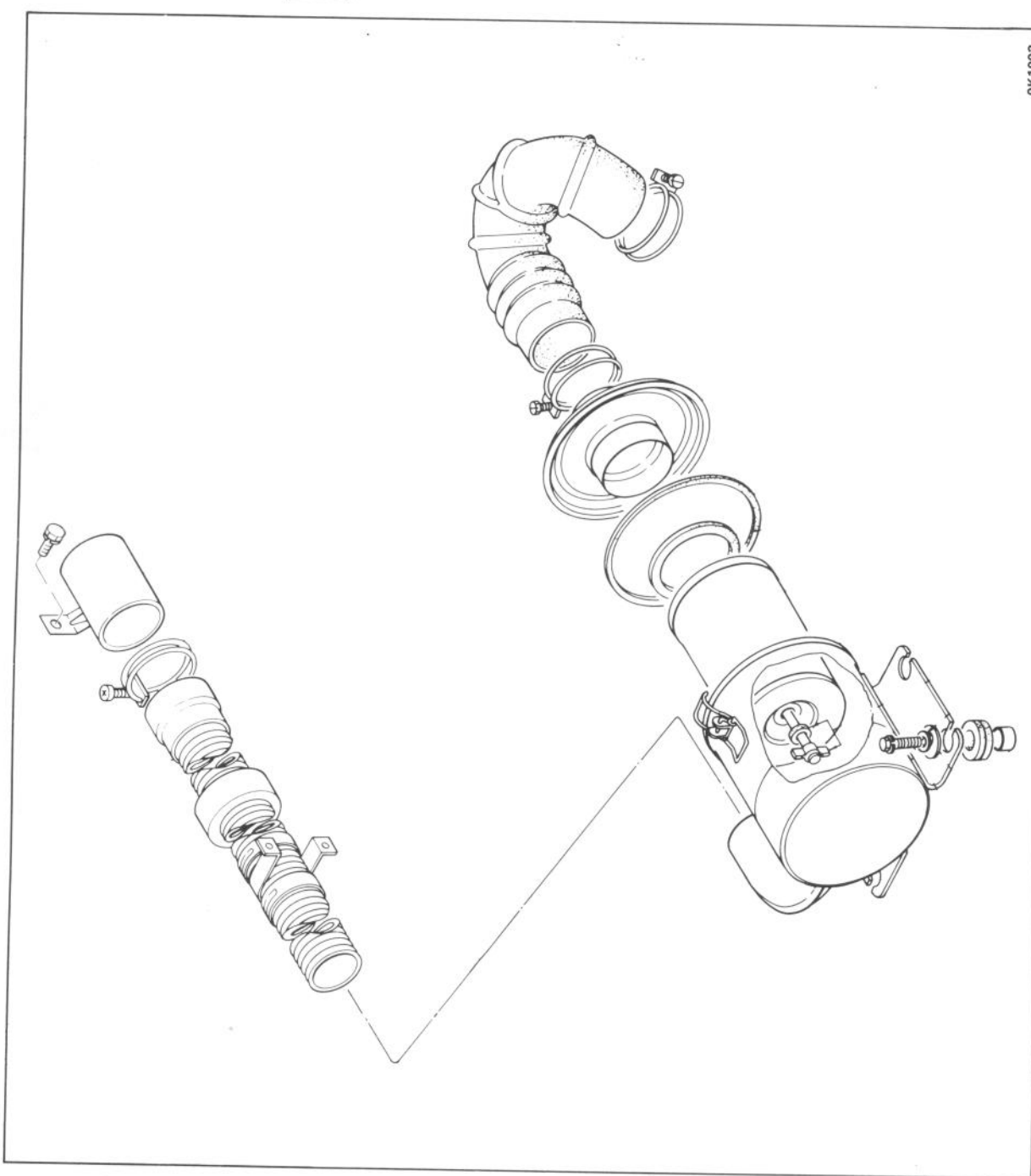
CONTENTS

	PAGE
General description — Intake system .....	6-1
General description — Exhaust system .....	6-5

GENERAL DESCRIPTION

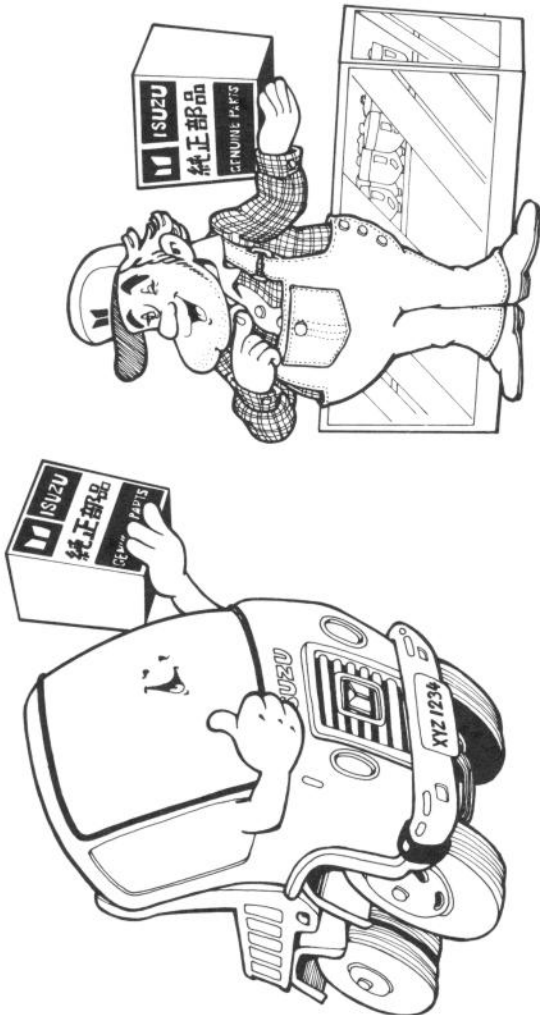
INTAKE SYSTEM

PAD model

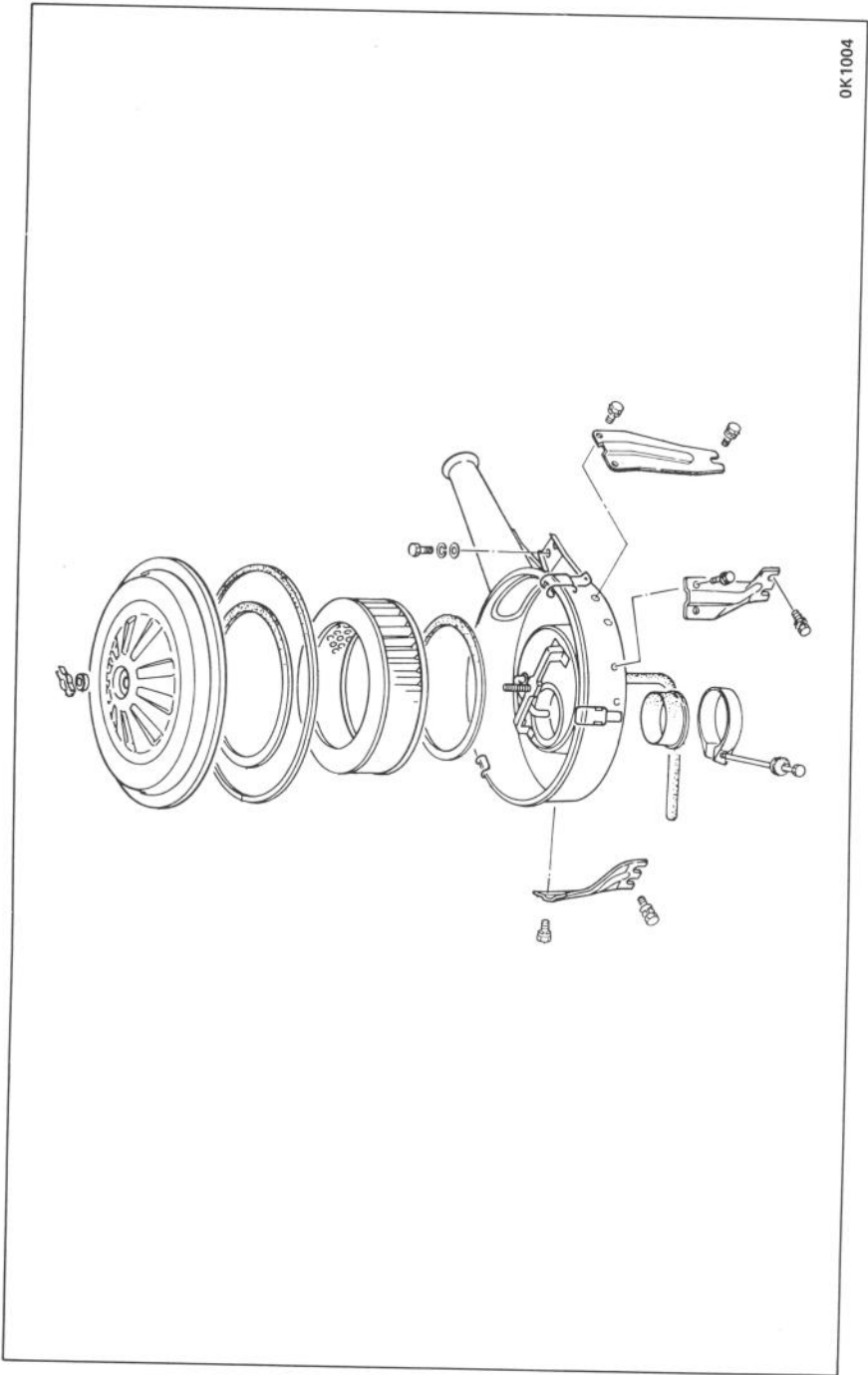


OK1003

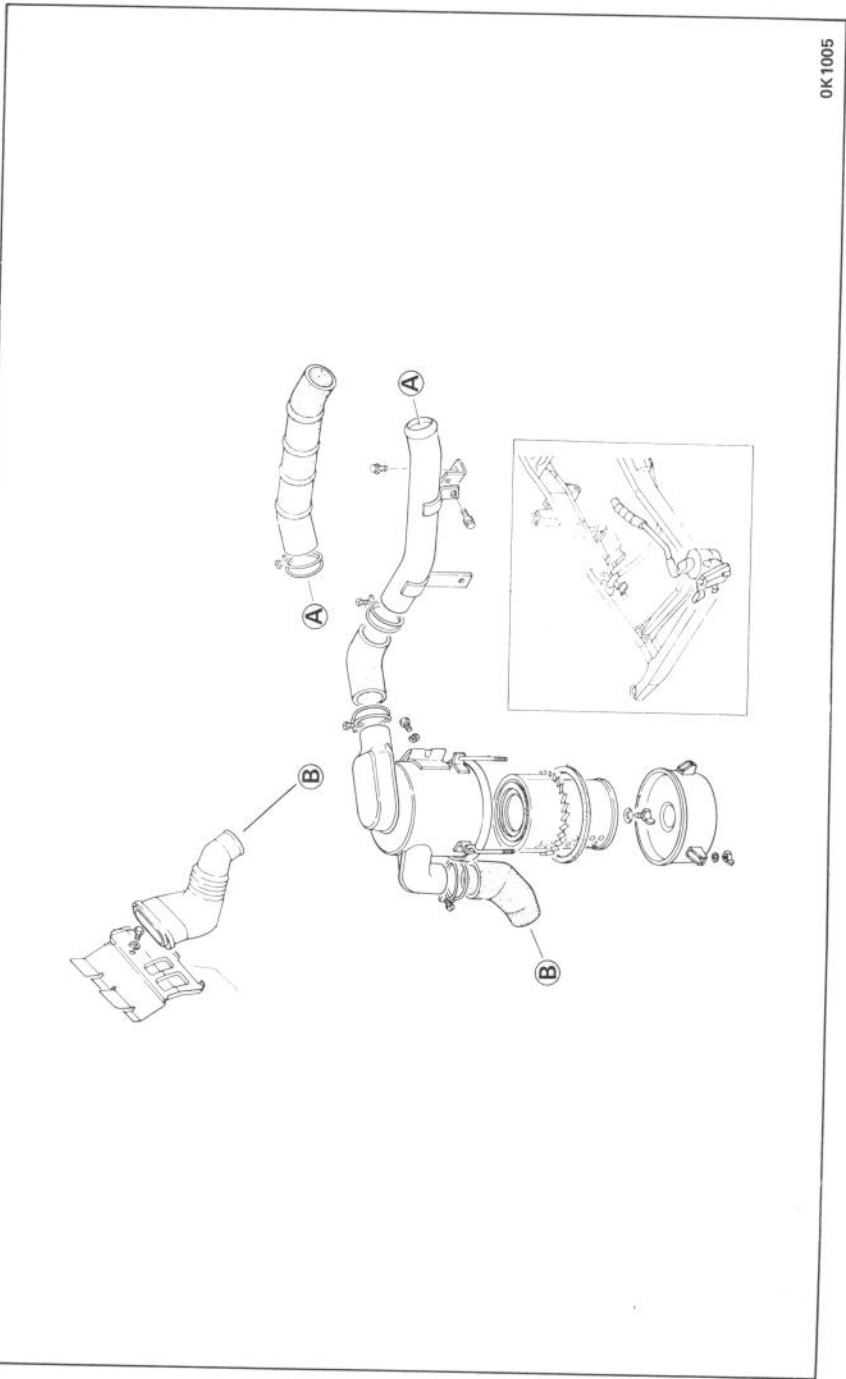
"QUALITY PARTS YOU CAN TRUST"



KBD model

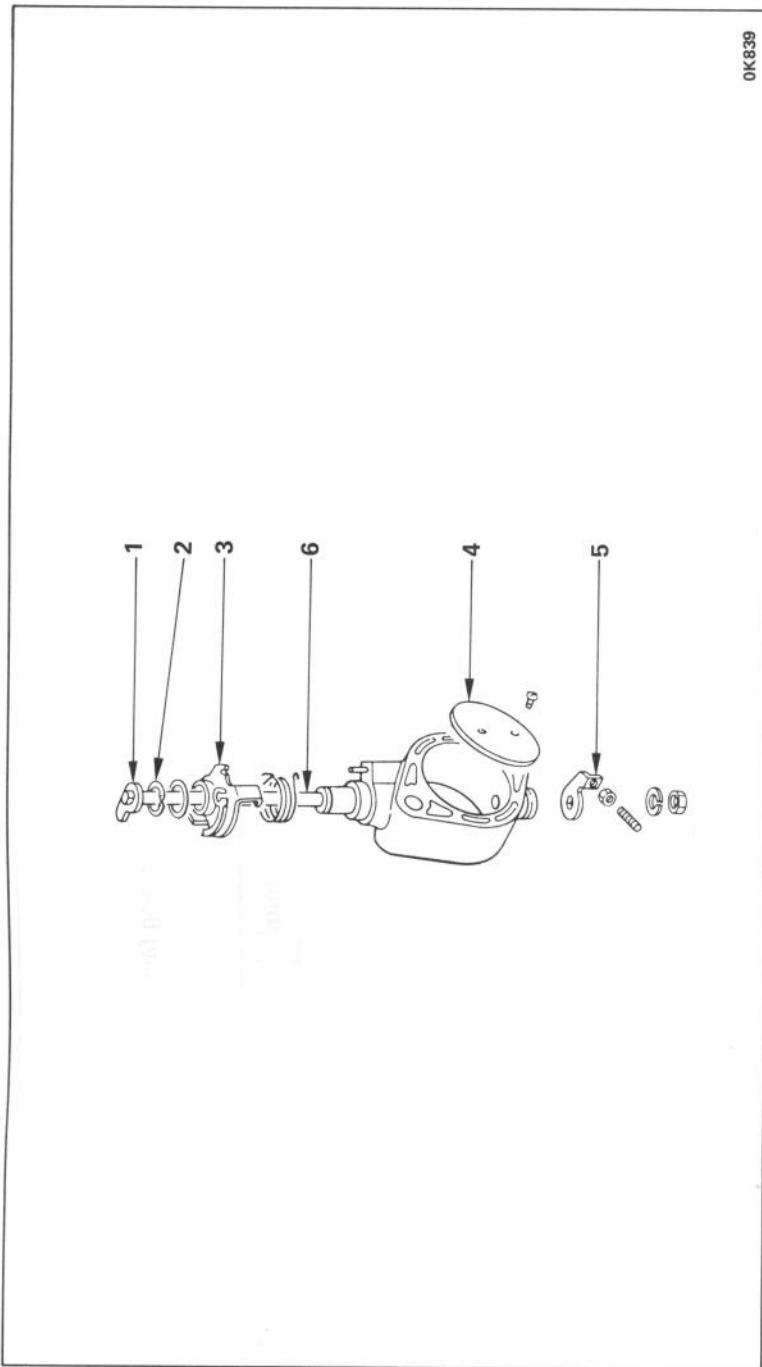


KAD and TLD models



## INTAKE MANIFOLD AND INTAKE SHUTTER

### DISASSEMBLY



### Disassembly steps

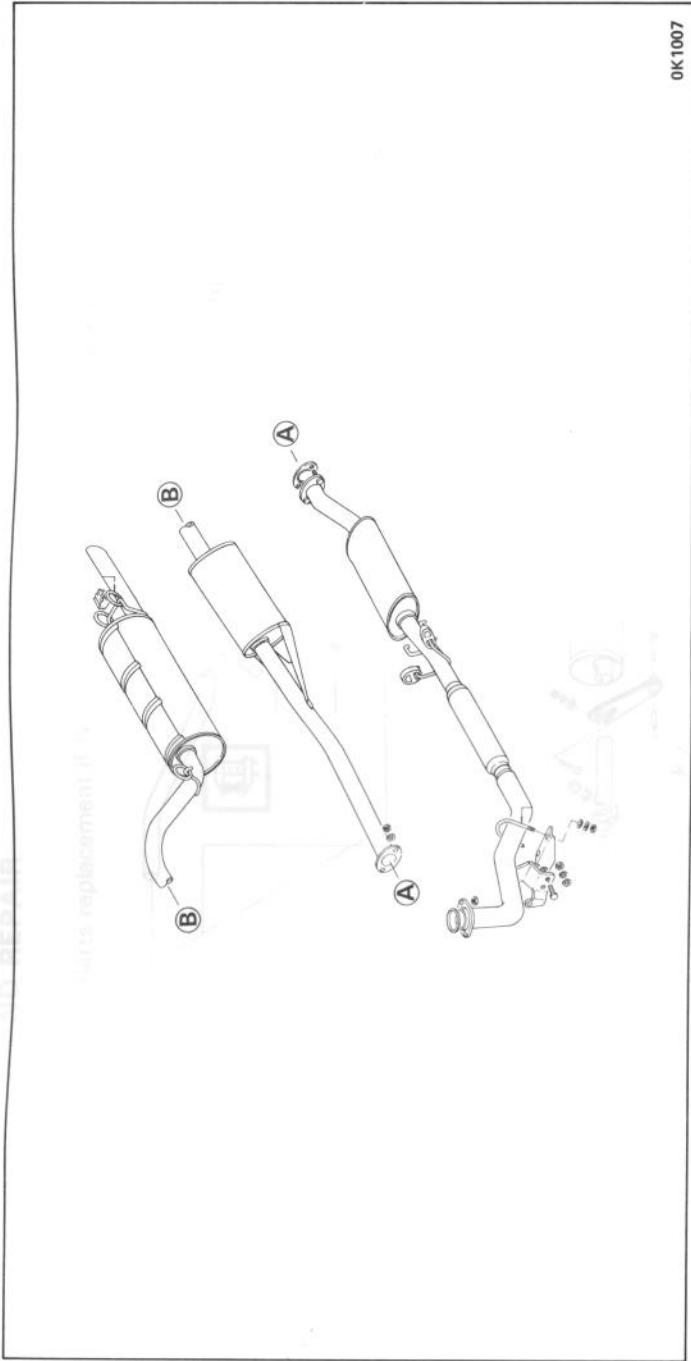
1. Intake shutter lever
2. Snap ring
3. Intake shutter lever
4. Intake shutter valve
5. Stopper lever
6. Intake shutter shaft

### INSPECTION AND REPAIR

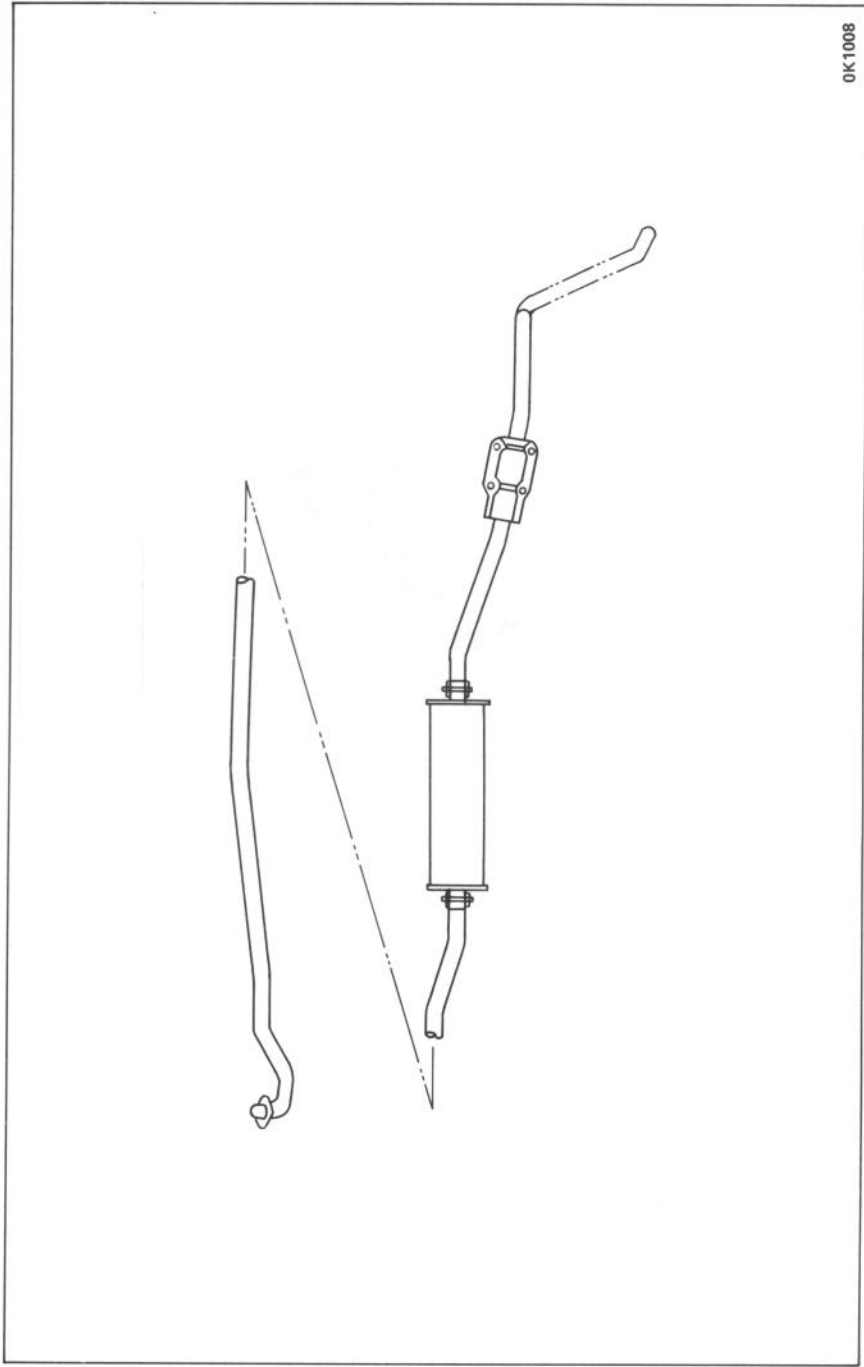
Make necessary correction or parts replacement if wear, damage or any other abnormal conditions are found through inspection.

EXHAUST SYSTEM

PAD model



KBD model



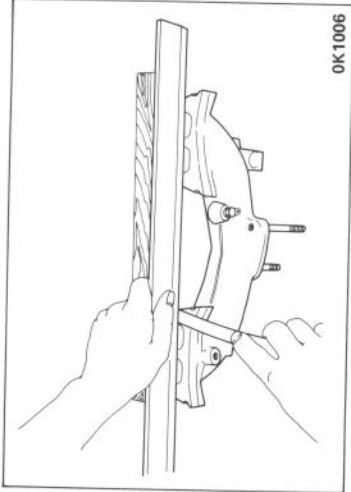
Clearance between shaft and bushing.

(mm)	
Standard	Limit
0.04 — 0.12	0.2

Intake manifold

Check cylinder head fitting face of the intake manifold for distortion.

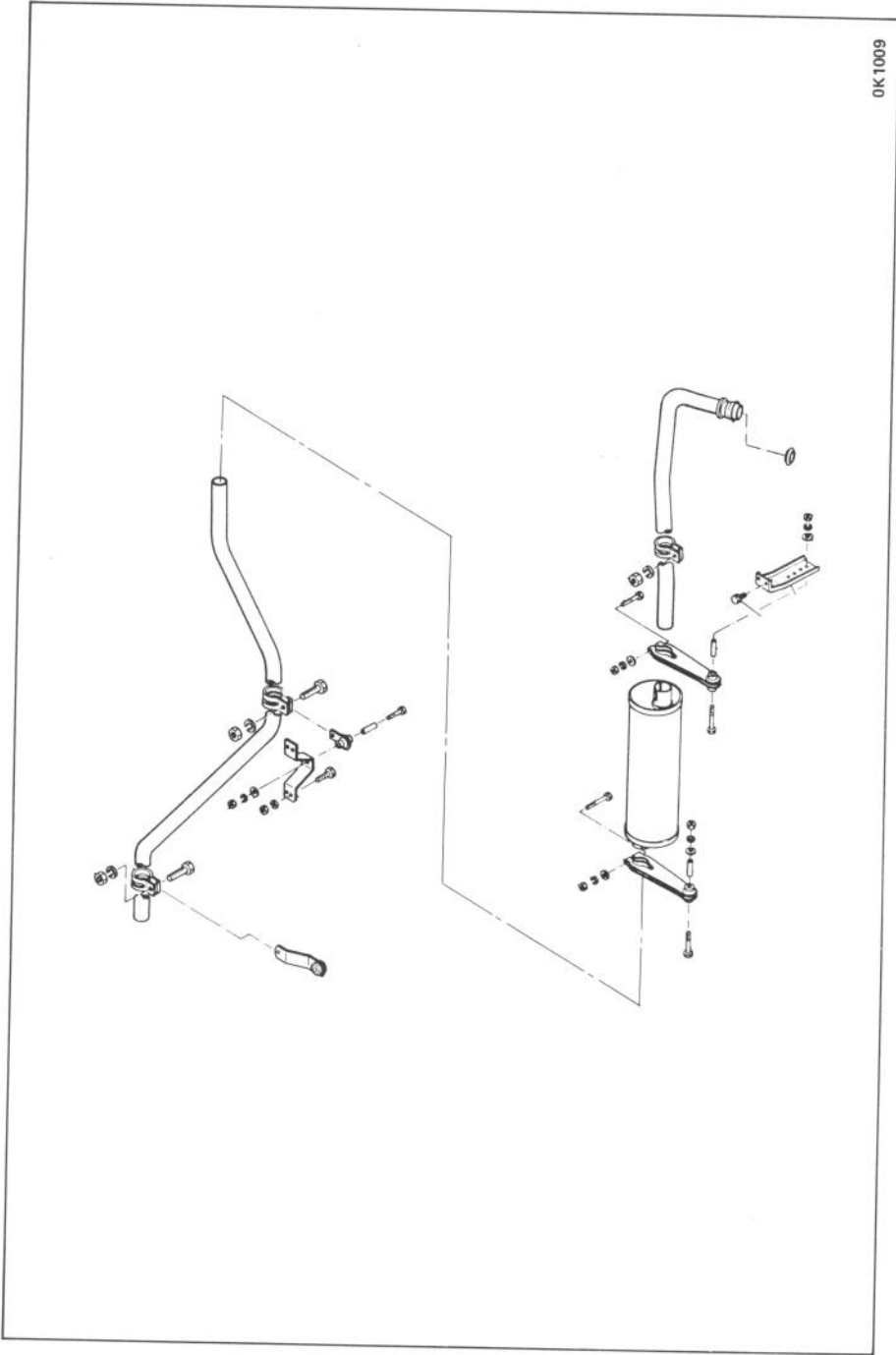
Limit	(mm)
0.4	



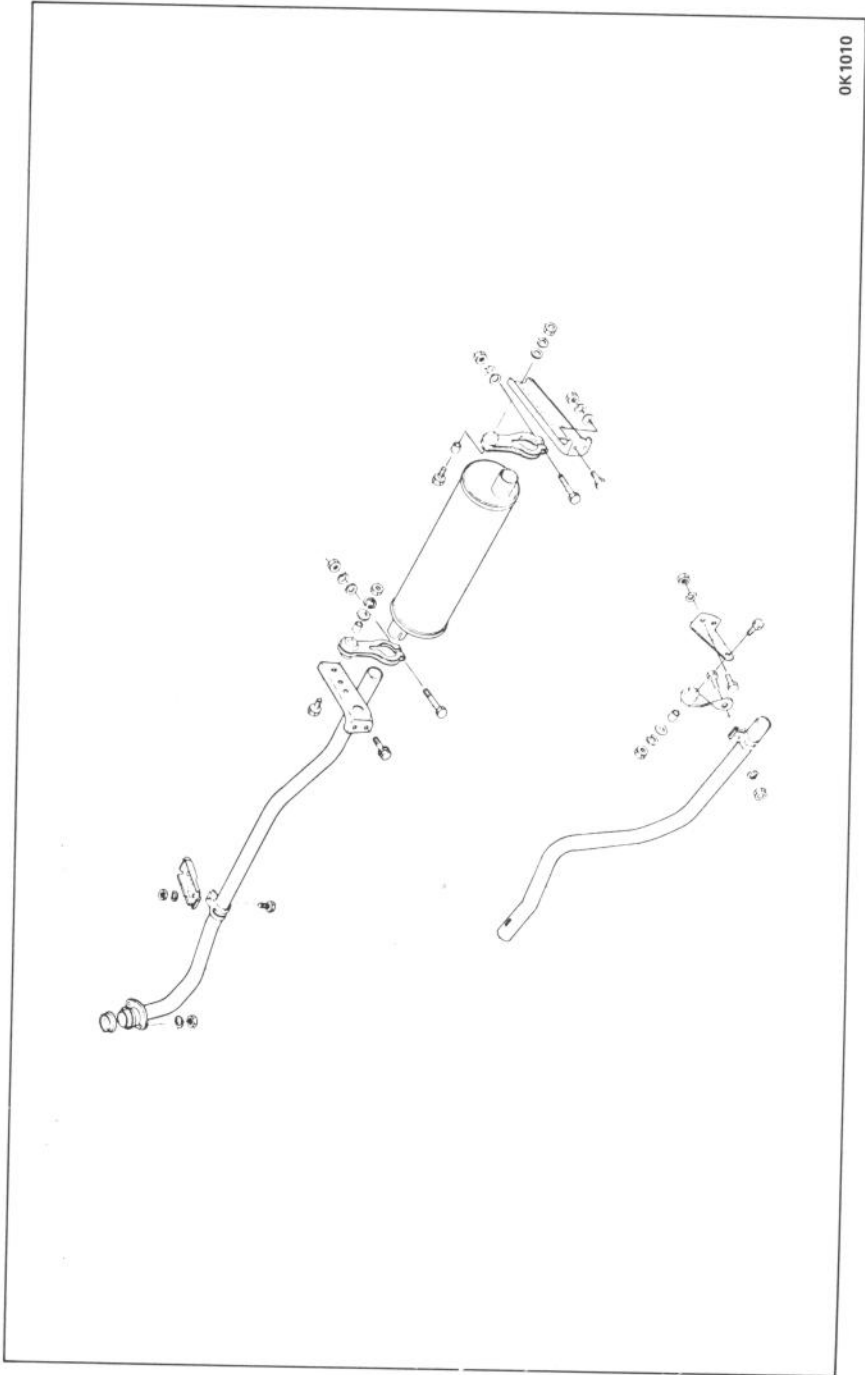
REASSEMBLY

To reassemble, follow the disassembly procedure in reverse order.

KAD model



TLD model

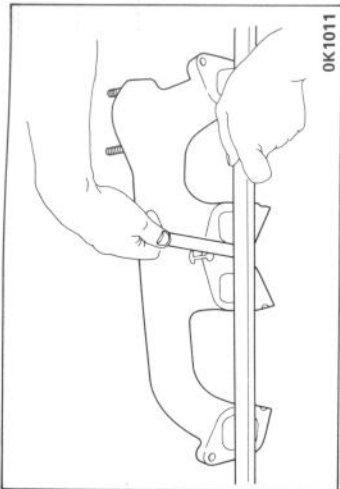


## EXHAUST MANIFOLD



### INSPECTION AND REPAIR

Make necessary correction or parts replacement if wear, damage or any other abnormal conditions are found through inspection.



Check cylinder head fitting face of the manifold for distortion.

Limit	(mm)
	0.4

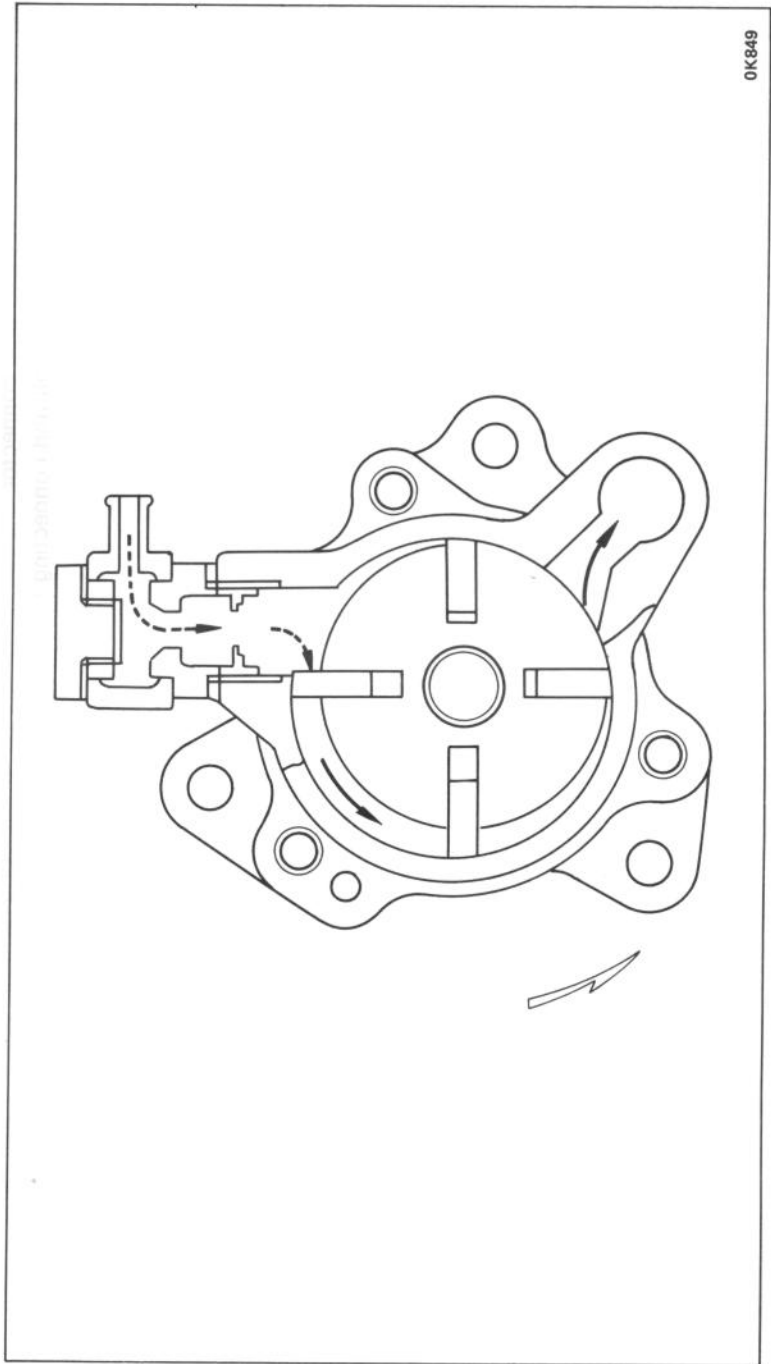
MEMO

SECTION 7  
AUXILIARIES

INDEX

CONTENTS	PAGE
Vacuum pump .....	7-1

VACUUM PUMP

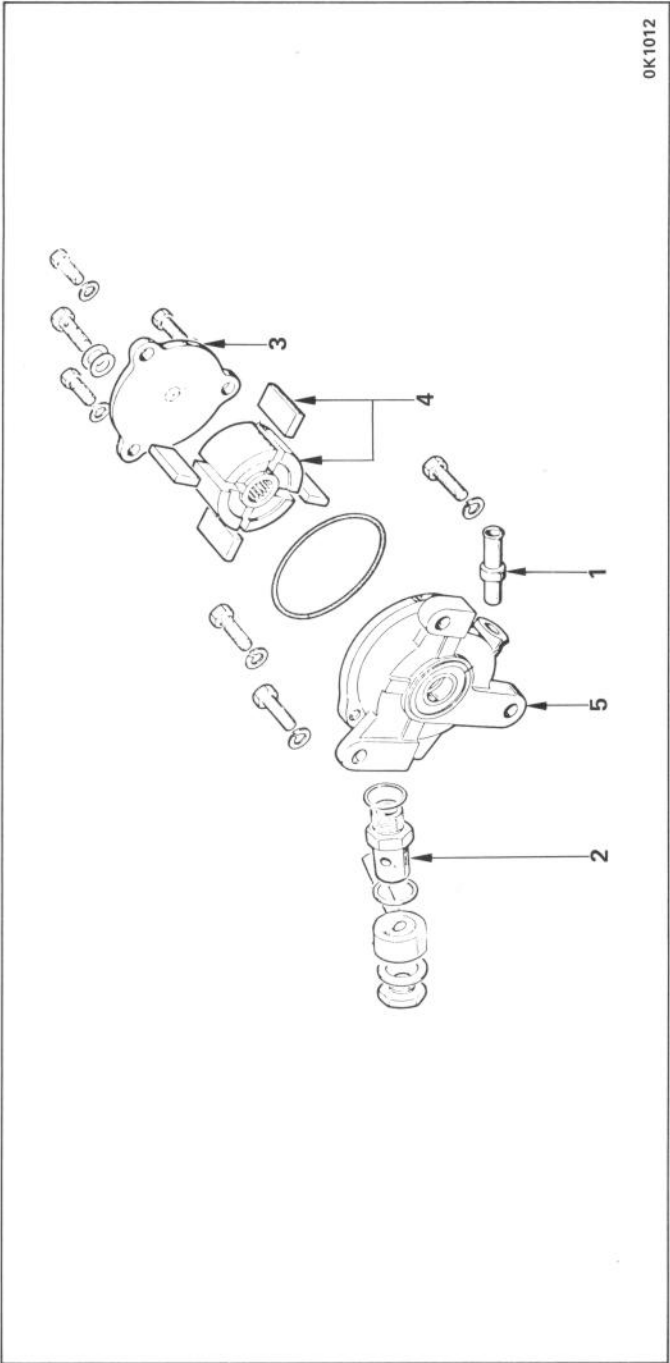


"QUALITY PARTS  
YOU CAN TRUST"





DISASSEMBLY



Disassembly steps

1. Vacuum pipe connector

2. Connecting bolt and connecting ring

3. Cover
4. Rotor assembly

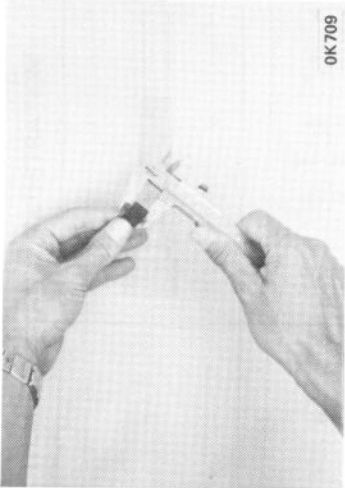
5. Housing

6. Flange



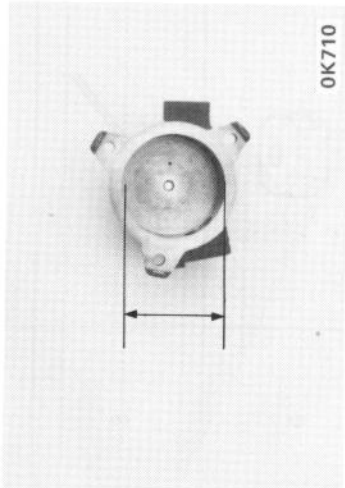
INSPECTION

Make necessary correction or parts replacement if wear, damage or any other abnormal conditions are found through inspection.



Measure the length of vanes.

Standard	(mm)	13 — 14
----------	------	---------



Measure the inside diameter of housing

Standard	(mm)	57.0 — 57.1
----------	------	-------------









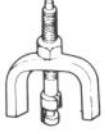


REASSEMBLY

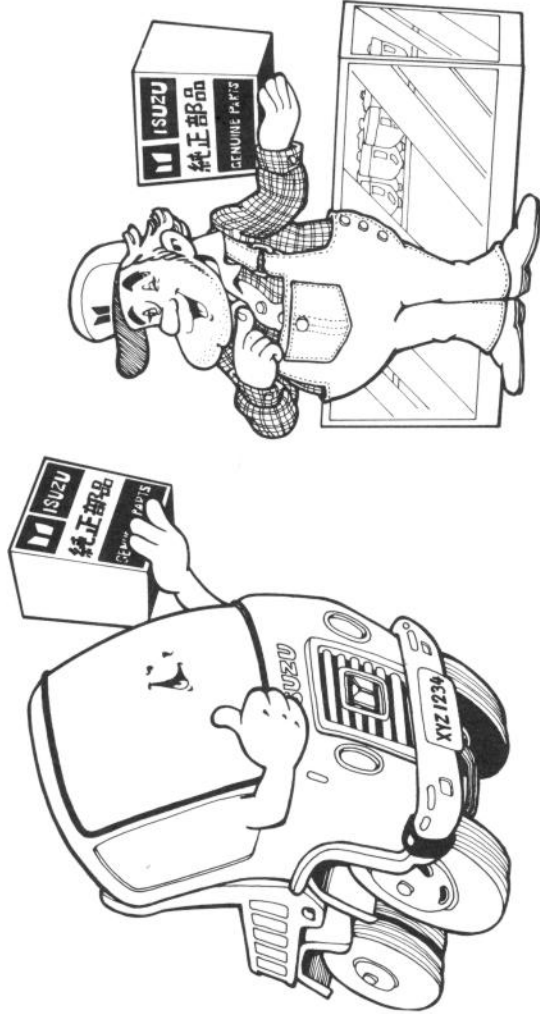
To assemble, follow the disassembly procedure in reverse order.

MEMO

SECTION 8  
SPECIAL TOOL LIST

ITEM NO.	ILLUSTRATION	PARTS NO.	PARTS NAME	PAGE
1.		5-83571-002-0	Compression gauge adaptor	1-19
2.		5-85210-016-0	Steering wheel remover	2-17
3.		9-8523-1423-0	Valve spring compressor	2-19 2-42
4.		9-8523-2552-0 (+A)	Cylinder liner remover	2-22
5.		(A) 9-8522-1148-0	Grip	2-22
6.		9-8523-2551-0	Cylinder liner installer	2-23
7.		9-8521-0074-0	Crankshaft timing gear remover	2-25
8.		9-8521-0021-0	Crankshaft timing gear installer	2-25 2-47
9.		9-8523-1812-0	Crankshaft pilot bearing remover	2-26

"QUALITY PARTS YOU CAN TRUST"



SECTION 9

CONVERSION TABLE

INDEX

CONTENTS

	PAGE
Length .....	9-1
Area .....	9-3
Volume .....	9-3
Mass .....	9-5
Pressure .....	9-6
Torque .....	9-7
Temperature .....	9-7








LENGTH

MILLIMETERS TO INCHES

mm	in.	mm	in.	mm	in.
1	0.0394	26	1.0236	51	2.0079
2	0.0787	27	1.0630	52	2.0472
3	0.1181	28	1.1024	53	2.0866
4	0.1575	29	1.1417	54	2.1260
5	0.1968	30	1.1811	55	2.1653
6	0.2362	31	1.2205	56	2.2047
7	0.2756	32	1.2598	57	2.2441
8	0.3150	33	1.2992	58	2.2835
9	0.3543	34	1.3386	59	2.3228
10	0.3937	35	1.3779	60	2.3622
11	0.4331	36	1.4173	61	2.4016
12	0.4724	37	1.4567	62	2.4409
13	0.5118	38	1.4961	63	2.4803
14	0.5512	39	1.5354	64	2.5197
15	0.5905	40	1.5748	65	2.5590
16	0.6299	41	1.6142	66	2.5984
17	0.6693	42	1.6535	67	2.6378
18	0.7087	43	1.6929	68	2.6772
19	0.7480	44	1.7323	69	2.7165
20	0.7874	45	1.7716	70	2.7559
21	0.8268	46	1.8110	71	2.7953
22	0.8661	47	1.8504	72	2.8346
23	0.9055	48	1.8898	73	2.8740
24	0.9449	49	1.9291	74	2.9134
25	0.9842	50	1.9685	75	2.9527

INCHES TO MILLIMETERS

in.	mm	in.	mm
1/64	0.3969	33/64	13.0969
1/32	0.7937	17/32	13.4937
3/64	1.1906	35/64	13.8906
1/16	1.5875	9/16	14.2875
5/64	1.9844	37/64	14.6844
3/32	2.3812	19/32	15.0812
7/64	2.7781	39/64	15.4781
1/8	3.1750	5/8	15.8750
5/32	3.5719	41/64	16.2719
9/64	3.9687	21/32	16.6687
11/64	4.3656	43/64	17.0656
3/16	4.7625	11/16	17.4625
13/64	5.1594	45/64	17.8594
7/32	5.5562	23/32	18.2562
15/64	5.9531	47/64	18.6531
1/4	6.3500	3/4	19.0500
17/64	6.7469	49/64	19.4469
9/32	7.1437	25/32	19.8437
5/16	7.5406	51/64	20.2406
19/64	7.9375	13/16	20.6375
21/64	8.3344	53/64	21.0344
11/32	8.7312	27/32	21.4312
23/64	9.1281	55/64	21.8281
3/8	9.5250	7/8	22.2250
25/64	9.9219	57/64	22.6219
13/32	10.3187	29/32	23.0187
27/64	10.7156	59/64	23.4156
7/16	11.1125	15/16	23.8125
29/64	11.5094	61/64	24.2094
15/32	11.9062	31/32	24.6062
31/64	12.3031	63/64	25.0031
1/2	12.7000	1	25.4000

ITEM NO.	ILLUSTRATION	PARTS NO.	PARTS NAME	PAGE
10.		9-8523-1369-0	Piston pin bushing remover & installer	2-29
11.		5-85230-002-0	Valve guide remover & installer	2-33
12.		9-8523-1737-0 9-8523-1360-0	Camshaft pilot bearing remover & installer	2-36
13.		5-85210-002-0	Universal puller	2-36 2-36
14.		5-85220-013-0	Crankshaft front oil seal installer	2-40
15.		9-8522-1279-0	Crankshaft rear oil seal installer	2-47
16.		9-8522-1255-0	Piston ring compressor	2-48



FEET TO METERS

ft.	0	1	2	3	4	5	6	7	8	9	ft.
—	m	m	m	m	m	m	m	m	m	m	—
10	3.048	0.305	0.610	0.914	1.219	1.524	1.829	2.134	2.438	2.743	—
20	6.096	3.353	3.658	3.962	4.267	4.572	4.877	5.182	5.486	5.791	10
30	9.144	6.401	6.706	7.010	7.315	7.620	7.925	8.230	8.534	8.839	20
40	12.192	9.449	9.754	10.058	10.363	10.668	10.973	11.278	11.582	11.887	30
50	15.240	12.497	12.802	13.106	13.411	13.716	14.021	14.326	14.630	14.935	40
60	18.288	15.545	15.850	16.154	16.459	16.764	17.069	17.374	17.678	17.983	50
70	21.336	18.593	18.898	19.202	19.507	19.812	20.117	20.422	20.726	21.031	60
80	24.384	21.641	21.946	22.250	22.555	22.860	23.165	23.470	23.774	24.079	70
90	27.432	24.689	24.994	25.298	25.603	25.908	26.213	26.518	26.822	27.127	80
100	30.480	27.737	28.042	28.346	28.651	28.956	29.261	29.566	29.870	30.175	90
		30.785	31.090	31.394	31.699	32.004	32.309	32.614	32.918	33.223	100

METERS TO FEET

m	0	1	2	3	4	5	6	7	8	9	m
—	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	—
10	32.8084	3.2808	6.5617	9.8425	13.1234	16.4042	19.6850	22.9659	26.2467	29.5276	—
20	65.6168	36.0892	39.3701	42.6509	45.9318	49.2126	52.4934	55.7743	59.0551	62.3360	10
30	98.4252	68.8976	72.1785	75.4593	78.7402	82.0210	85.3018	88.5827	91.8635	95.1444	20
40	131.2336	101.7060	104.9869	108.2677	111.5486	114.8294	118.1102	121.3911	124.6719	127.9528	30
50	164.0420	134.5144	137.7953	141.0761	144.3570	147.6378	150.9186	154.1995	157.4803	160.7612	40
60	196.8504	167.3228	170.6037	173.8845	177.1654	180.4462	183.7270	187.0079	190.2887	193.5696	50
70	229.6588	200.1312	203.4121	206.6929	209.9738	213.2546	216.5354	219.8163	223.0971	226.3780	60
80	262.4672	232.9396	236.2205	239.5013	242.7822	246.0630	249.3438	252.6247	255.9055	259.1864	70
90	295.2756	265.7480	269.0289	272.3097	275.5906	278.8714	282.1522	285.4331	288.7139	291.9948	80
100	328.0840	298.5564	301.8373	305.1181	308.3990	311.6798	314.9606	318.2415	321.5223	324.8032	90
		331.3648	334.6457	337.9265	341.2074	344.4882	347.7690	351.0499	354.3307	357.6116	100

MILES TO KILOMETERS

miles	0	1	2	3	4	5	6	7	8	9	miles
—	km	km	km	km	km	km	km	km	km	km	—
10	16.093	1.609	3.219	4.828	6.437	8.047	9.656	11.265	12.875	14.484	—
20	32.187	3.218	6.437	9.656	12.875	16.093	19.312	22.531	25.750	28.968	10
30	48.280	4.828	9.656	14.484	21.309	28.146	34.983	41.820	48.657	55.494	20
40	64.374	6.437	12.875	19.312	25.750	32.187	38.624	45.062	51.499	57.936	30
50	80.467	8.047	16.093	24.140	32.187	40.234	48.280	56.327	64.374	72.421	40
60	96.561	9.656	19.312	28.146	37.071	45.932	54.793	63.654	72.515	81.376	50
70	112.655	11.265	22.531	34.983	47.938	60.893	73.848	86.803	99.758	112.713	60
80	128.750	12.875	25.750	39.371	52.742	65.593	78.448	91.303	104.158	117.013	70
90	144.844	14.484	29.528	44.289	59.174	73.009	86.834	100.660	114.485	128.310	80
100	160.938	16.094	32.188	48.282	64.376	80.470	96.564	112.658	128.752	144.846	90
		162.540	32.188	48.282	64.376	80.470	96.564	112.658	128.752	144.846	100

KILOMETERS TO MILES

km	0	1	2	3	4	5	6	7	8	9	km
—	miles	miles	miles	miles	miles	miles	miles	miles	miles	miles	—
10	6.214	0.621	1.243	1.864	2.486	3.107	3.728	4.350	4.971	5.592	—
20	12.427	1.243	2.486	3.728	4.971	6.214	7.457	8.699	9.942	11.185	10
30	18.641	1.864	3.728	5.592	7.457	9.311	11.185	13.049	14.913	16.776	20
40	24.855	2.486	4.971	7.457	9.942	12.427	14.913	17.399	19.871	22.343	30
50	31.069	3.107	6.214	9.311	12.427	15.534	18.641	21.748	24.855	27.962	40
60	37.282	3.728	7.457	11.185	14.913	18.641	22.343	26.045	29.147	32.250	50
70	43.497	4.349	8.699	13.049	17.399	21.748	25.997	29.747	33.497	37.247	60
80	49.711	4.971	9.942	14.913	19.871	24.855	29.747	34.647	39.539	44.431	70
90	55.924	5.592	11.185	17.399	22.343	27.962	32.854	37.746	42.638	47.530	80
100	62.138	6.214	12.427	18.641	24.855	31.069	36.961	42.533	48.445	54.357	90
		62.759	12.427	18.641	24.855	31.069	36.961	42.533	48.445	54.357	100

AREA

SQUARE INCHES TO SQUARE CENTIMETERS

in <sup>2</sup>	0	1	2	3	4	5	6	7	8	9	in <sup>2</sup>
—	cm <sup>2</sup>	cm <sup>2</sup>	cm <sup>2</sup>	cm <sup>2</sup>	cm <sup>2</sup>	cm <sup>2</sup>	cm <sup>2</sup>	cm <sup>2</sup>	cm <sup>2</sup>	cm <sup>2</sup>	—
10	64.516	6.452	12.903	19.355	25.806	32.258	38.710	45.161	51.613	58.064	—
20	129.032	12.903	25.806	38.710	51.613	64.516	77.419	90.322	103.226	116.129	10
30	193.548	19.355	38.710	58.064	77.419	96.872	116.325	135.778	155.231	174.684	20
40	258.064	25.806	51.613	77.419	103.226	129.032	154.838	180.645	206.451	232.258	30
50	322.580	32.258	64.516	96.872	129.032	154.838	180.645	206.451	232.258	258.064	40
60	387.096	38.710	77.419	103.226	129.032	154.838	180.645	206.451	232.258	258.064	50
70	451.612	45.161	90.322	129.032	154.838	180.645	206.451	232.258	258.064	283.871	60
80	516.128	51.613	103.226	154.838	180.645	206.451	232.258	258.064	283.871	316.128	70
90	580.644	58.064	116.129	174.684	206.451	232.258	258.064	283.871	316.128	349.085	80
100	645.160	64.516	129.032	193.548	232.258	283.871	322.580	361.888	400.905	439.922	90
		651.612	135.685	200.000	248.686	299.999	341.935	383.880	425.825	467.770	100

SQUARE CENTIMETERS TO SQUARE INCHES

cm <sup>2</sup>	0	1	2	3	4	5	6	7	8	9	cm <sup>2</sup>
—	in <sup>2</sup>	in <sup>2</sup>	in <sup>2</sup>	in <sup>2</sup>	in <sup>2</sup>	in <sup>2</sup>	in <sup>2</sup>	in <sup>2</sup>	in <sup>2</sup>	in <sup>2</sup>	—
10	1.550	0.155	0.310	0.465	0.620	0.775	0.930	1.085	1.240	1.395	—
20	3.100	0.310	0.620	0.930	1.240	1.550	1.860	2.170	2.480	2.790	10
30	4.650	0.465	0.930	1.395	1.860	2.325	2.790	3.255	3.720	4.185	20
40	6.200	0.620	1.240	1.860	2.480	3.100	3.720	4.340	4.960	5.580	30
50	7.750	0.775	1.550	2.325	3.100	3.875	4.650	5.425	6.200	6.975	40
60	9.300	0.930	1.860	2.790	3.720	4.650	5.580	6.510	7.440	8.370	50
70	10.850	1.085	2.170	3.255	4.340	5.425	6.510	7.600	8.685	9.770	60
80	12.400	1.240	2.480	3.720	4.960	6.200	7.440	8.685	9.925	11.165	70
90	13.950	1.395	2.790	4.185	5.425	6.665	7.905	9.145	10.385	11.625	80
100	15.500	1.550	3.100	4.650	6.200	7.750	9.300	10.850	12.400	13.950	90
		15.655	3.255	4.960	6.700	8.405	10.110	11.815	13.520	15.225	100

VOLUME

CUBIC INCHES TO CUBIC CENTIMETERS

in <sup>3</sup>	0	1	2	3	4	5	6	7	8	9	in <sup>3</sup>
—	cm <sup>3</sup> (cc)	cm <sup>3</sup> (cc)	cm <sup>3</sup> (cc)	cm <sup>3</sup> (cc)	cm <sup>3</sup> (cc)	cm <sup>3</sup> (cc)	cm <sup>3</sup> (cc)	cm <sup>3</sup> (cc)	cm <sup>3</sup> (cc)	cm <sup>3</sup> (cc)	—
10	163.871	16.387	32.774	49.161	65.548	81.935	98.322	114.709	131.097	147.484	—
20	327.741	32.774	65.548	98.322	131.097	163.871	196.645	229.419	262.193	294.967	10
30	491.612	49.161	98.322	147.484	229.419	327.741	360.515	393.290	426.064	458.838	20
40	655.483	65.548	131.097	196.645	262.193	327.741	393.290	458.838	524.386	589.934	30
50	819.353	81.935	163.871	248.686	327.741	407.083	485.969	564.855	643.741	722.627	40
60	983.224	98.322	196.645	294.967	360.515	426.064	485.969	545.884	605.799	665.714	50
70	1147.094	114.709	229.419	341.188	426.064	485.969	545.884	605.799	665.714	725.629	60
80	1310.965	131.097	262.193	393.290	458.838	524.386	589.934	655.483	721.031	786.579	70
90	1474.836	147.484	294.967	426.064	485.969	545.884	605.799	665.714	725.629	785.540	80
100	1638.706	163.871	327.741	458.838	524.386	589.934	655.483	721.031	786.579	852.127	90
		1655.093	327.741	458.838	524.386	589.934	655.483	721.031	786.579	852.127	100

CUBIC CENTIMETERS TO CUBIC INCHES

cm <sup>3</sup> (cc)	0	1	2	3	4	5	6	7	8	9	cm <sup>3</sup> (cc)
	in <sup>3</sup>	in <sup>3</sup>	in <sup>3</sup>	in <sup>3</sup>	in <sup>3</sup>	in <sup>3</sup>	in <sup>3</sup>	in <sup>3</sup>	in <sup>3</sup>	in <sup>3</sup>	
—		0.0610	0.1220	0.1831	0.2441	0.3051	0.3661	0.4272	0.4882	0.5492	—
10	0.6102	0.6713	0.7323	0.7933	0.8543	0.9154	0.9764	1.0374	1.0984	1.1595	10
20	1.2205	1.2815	1.3425	1.4035	1.4646	1.5256	1.5866	1.6476	1.7087	1.7697	20
30	1.8307	1.8917	1.9528	2.0138	2.0748	2.1358	2.1969	2.2579	2.3189	2.3799	30
40	2.4409	2.5020	2.5630	2.6240	2.6850	2.7461	2.8071	2.8681	2.9291	2.9902	40
50	3.0512	3.1122	3.1732	3.2343	3.2953	3.3563	3.4173	3.4784	3.5394	3.6004	50
60	3.6614	3.7224	3.7835	3.8445	3.9055	3.9665	4.0276	4.0886	4.1495	4.2106	60
70	4.2717	4.3327	4.3937	4.4547	4.5158	4.5768	4.6378	4.6988	4.7599	4.8209	70
80	4.8819	4.9429	5.0039	5.0650	5.1260	5.1870	5.2480	5.3091	5.3701	5.4311	80
90	5.4921	5.5532	5.6142	5.6752	5.7362	5.7973	5.8583	5.9193	5.9803	6.0414	90
100	6.1024	6.1634	6.2244	6.2854	6.3465	6.4075	6.4685	6.5295	6.5906	6.6516	100

GALLONS (U. S.) TO LITERS

U.S. gal.	0	1	2	3	4	5	6	7	8	9	U.S. gal.
	liters	liters	liters	liters	liters	liters	liters	liters	liters	liters	
—		3.7854	7.5709	11.3563	15.1417	18.9271	22.7126	26.4980	30.2834	34.0638	—
10	37.8543	41.6397	45.4251	49.2105	52.9960	56.7814	60.5668	64.3523	68.1377	71.9231	10
20	75.7085	79.4940	83.2794	87.0648	90.8502	94.6357	98.4211	102.2065	105.9920	109.7774	20
30	113.5528	117.3482	121.1337	124.9191	128.7045	132.4899	136.2754	140.0608	143.8462	147.6316	30
40	151.4171	155.2025	158.9879	162.7734	166.5588	170.3442	174.1296	177.9151	181.7005	185.4859	40
50	189.2713	193.0568	196.8422	200.6276	204.4131	208.1985	211.9839	215.7693	219.5548	223.3402	50
60	227.1256	230.9110	234.6965	238.4819	242.2673	246.0527	249.8382	253.6236	257.4090	261.1945	60
70	264.9799	268.7653	272.5507	276.3362	280.1216	283.9070	287.6924	291.4779	295.2633	299.0487	70
80	302.8342	306.6196	310.4050	314.1904	317.9759	321.7613	325.5467	329.3321	333.1176	336.9030	80
90	340.6884	344.4738	348.2593	352.0447	355.8301	359.6156	363.4010	367.1864	370.9718	374.7573	90
100	378.5427	382.3281	386.1135	389.8990	393.6844	397.4698	401.2553	405.0407	408.8261	412.6115	100

LITERS TO GALLONS (U.S.)

liters	0	1	2	3	4	5	6	7	8	9	liters
	gal.	gal.	gal.	gal.	gal.	gal.	gal.	gal.	gal.	gal.	
—		0.2642	0.5283	0.7925	1.0567	1.3209	1.5850	1.8492	2.1134	2.3775	—
10	2.6417	2.9059	3.1701	3.4342	3.6984	3.9626	4.2267	4.4909	4.7551	5.0192	10
20	5.2834	5.5476	5.8118	6.0759	6.3401	6.6043	6.8684	7.1326	7.3968	7.6610	20
30	7.9251	8.1893	8.4535	8.7176	8.9818	9.2460	9.5102	9.7743	10.0385	10.3027	30
40	10.5668	10.8310	11.0952	11.3594	11.6235	11.8877	12.1519	12.4160	12.6802	12.9444	40
50	13.2086	13.4727	13.7369	14.0011	14.2652	14.5294	14.7936	15.0577	15.3219	15.5861	50
60	15.8503	16.1144	16.3786	16.6428	16.9069	17.1711	17.4353	17.6995	17.9636	18.2278	60
70	18.4920	18.7561	19.0203	19.2845	19.5487	19.8128	20.0770	20.3412	20.6053	20.8695	70
80	21.1337	21.3979	21.6620	21.9262	22.1904	22.4545	22.7187	22.9829	23.2470	23.5112	80
90	23.7754	24.0396	24.3037	24.5679	24.8321	25.0962	25.3604	25.6246	25.8888	26.1529	90
100	26.4171	26.6813	26.9454	27.2096	27.4738	27.7380	28.0021	28.2663	28.5305	28.7946	100

GALLONS (IMP.) TO LITERS

Imp gal.	0	1	2	3	4	5	6	7	8	9	Imp gal.
	liters	liters	liters	liters	liters	liters	liters	liters	liters	liters	
—		4.5460	9.0919	13.6379	18.1838	22.7298	27.2758	31.8217	36.3677	40.9136	—
10	45.4596	50.0056	54.5515	59.0975	63.6434	68.1894	72.7354	77.2813	81.8275	86.3732	10
20	90.9192	95.4652	100.0111	104.5571	109.1030	113.6490	118.1950	122.7409	127.2869	131.8328	20
30	136.3788	140.9248	145.4707	150.0167	154.5626	159.1086	163.6546	168.0005	172.7465	177.2924	30
40	181.8384	186.3844	190.9303	195.4763	200.0222	204.5682	209.1142	213.6601	218.2061	222.7520	40
50	227.2980	231.8440	236.3899	240.9359	245.4818	250.0278	254.5738	259.1197	263.6657	268.2116	50
60	272.7576	277.3036	281.8495	286.3955	290.9414	295.4874	300.0334	304.5793	309.1253	313.6712	60
70	318.2172	322.7632	327.3091	331.8551	336.4010	340.9470	345.4930	350.0389	354.5849	359.1308	70
80	363.6768	368.2228	372.7687	377.3147	381.8606	386.4066	390.9526	395.4985	400.0445	404.5904	80
90	409.1364	413.6824	418.2283	422.7743	427.3202	431.8662	436.4122	440.9581	445.5041	450.0500	90
100	454.5960	459.1420	463.6879	468.2339	472.7798	477.3258	481.8718	486.4177	490.9637	495.5096	100

LITERS TO GALLONS (IMP.)

liters	0	1	2	3	4	5	6	7	8	9	liters
	gal.	gal.	gal.	gal.	gal.	gal.	gal.	gal.	gal.	gal.	
—		0.2200	0.4400	0.6599	0.8799	1.0999	1.3199	1.5398	1.7598	1.9798	—
10	2.1998	2.4197	2.6397	2.8597	3.0797	3.2996	3.5196	3.7396	3.9596	4.1795	10
20	4.3995	4.6195	4.8395	5.0594	5.2794	5.4994	5.7194	5.9394	6.1593	6.3793	20
30	6.5993	6.8193	7.0392	7.2592	7.4792	7.6992	7.9191	8.1391	8.3591	8.5791	30
40	8.7990	9.0190	9.2390	9.4590	9.6789	9.8989	10.1189	10.3389	10.5588	10.7788	40
50	10.9988	11.2188	11.4388	11.6587	11.8787	12.0987	12.3187	12.5386	12.7586	12.9786	50
60	13.1986	13.4185	13.6385	13.8585	14.0785	14.2984	14.5184	14.7384	14.9584	15.1783	60
70	15.3983	15.6183	15.8383	16.0582	16.2782	16.4982	16.7182	16.9382	17.1581	17.3781	70
80	17.5981	17.8181	18.0380	18.2580	18.4780	18.6980	18.9179	19.1379	19.3579	19.5779	80
90	19.7978	20.0178	20.2378	20.4578	20.6777	20.8977	21.1177	21.3377	21.5576	21.7776	90
100	21.9976	22.2176	22.4376	22.6575	22.8775	23.0975	23.3175	23.5374	23.7574	23.9774	100

MASS

POUNDS TO KILOGRAMS

lbs.	0	1	2	3	4	5	6	7	8	9	lbs.
	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	
—		0.454	0.907	1.361	1.814	2.268	2.722	3.175	3.629	4.082	—
10	4.536	4.990	5.443	5.897	6.350	6.804	7.257	7.711	8.165	8.618	10
20	9.072	9.525	9.979	10.433	10.886	11.340	11.793	12.247	12.701	13.154	20
30	13.608	14.061	14.515	14.969	15.422	15.876	16.329	16.783	17.237	17.690	30
40	18.144	18.597	19.051	19.504	19.958	20.412	20.865	21.319	21.772	22.226	40
50	22.680	23.133	23.587	24.040	24.494	24.948	25.401	25.855	26.308	26.762	50
60	27.216	27.669	28.123	28.576	29.030	29.484	29.937	30.391	30.844	31.298	60
70	31.751	32.205	32.659	33.112	33.566	34.019	34.473	34.927	35.380	35.834	70
80	36.287	36.741	37.195	37.648	38.102	38.555	39.009	39.463	39.916	40.370	80
90	40.823	41.277	41.730	42.184	42.638	43.092	43.545	43.998	44.453	44.906	90
100	45.359	45.813	46.266	46.720	47.174	47.627	48.081	48.534	48.988	49.442	100

KILOGRAMS TO POUNDS

kg	0	1	2	3	4	5	6	7	8	9	kg
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	
—		2.205	4.409	6.614	8.818	11.023	13.228	15.432	17.637	19.842	—
10	22.046	24.251	26.455	28.660	30.865	33.069	35.274	37.479	39.683	41.888	10
20	44.092	46.297	48.502	50.706	52.911	55.116	57.320	59.525	61.729	63.934	20
30	66.139	68.343	70.548	72.752	74.957	77.162	79.366	81.571	83.776	85.980	30
40	88.185	90.389	92.594	94.799	97.003	99.208	101.410	103.621	105.820	108.030	40
50	110.230	112.440	114.640	116.840	119.050	121.250	123.460	125.660	127.870	130.070	50
60	132.280	134.480	136.690	138.890	141.100	143.300	145.510	147.710	149.910	152.120	60
70	154.320	156.530	158.730	160.940	163.140	165.350	167.550	169.760	171.960	174.170	70
80	176.370	178.570	180.780	182.980	185.190	187.390	189.600	191.800	194.010	196.210	80
90	198.420	200.620	202.830	205.030	207.230	209.440	211.640	213.850	216.050	218.260	90
100	220.460	222.670	224.870	227.080	229.280	231.490	233.690	235.890	238.100	240.300	100

KILOGRAMS TO NEWTON

kg	0	1	2	3	4	5	6	7	8	9	kg
	N	N	N	N	N	N	N	N	N	N	
—		9.81	19.61	29.42	39.23	49.03	58.81	68.65	78.45	88.26	—
10	98.07	107.87	117.68	127.49	137.29	147.10	156.91	166.71	176.52	186.33	10
20	196.13	205.94	215.75	225.55	235.36	245.17	254.97	264.78	274.59	284.39	20
30	294.20	304.01	313.81	323.62	333.43	343.23	353.04	362.85	372.65	382.46	30
40	392.27	402.07	411.88	421.69	431.49	441.30	451.11	460.91	470.72	480.53	40
50	490.33	500.14	509.95	519.75	529.56	539.37	549.17	558.98	568.79	578.59	50
60	588.40	598.21	608.01	617.82	627.63	637.43	647.24	657.05	666.85	676.66	60
70	686.47	696.27	706.08	715.89	725.69	735.50	745.31	755.11	764.92	774.73	70
80	784.53	794.34	804.15	813.95	823.76	833.57	843.37	853.18	862.99	872.79	80
90	882.60	892.41	902.21	912.02	921.83	931.63	941.44	951.25	961.05	970.86	90
100	980.66	990.47	1000.30	1010.08	1019.89	1029.69	1039.47	1049.31	1059.11	1068.92	100

NEWTON TO KILOGRAMS

N	0	10	20	30	40	50	60	70	80	90	N
	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	
—	—	1.020	2.039	3.059	4.079	5.099	6.118	7.138	8.158	9.177	—
100	10.197	11.217	12.237	13.256	14.276	15.296	16.315	17.335	18.355	19.375	100
200	20.394	21.414	22.434	23.453	24.473	25.493	26.513	27.532	28.552	29.572	200
300	30.591	31.611	32.631	33.651	34.670	35.690	36.710	37.729	38.749	39.769	300
400	40.789	41.808	42.828	43.848	44.868	45.887	46.907	47.927	48.946	49.966	400
500	50.986	52.006	53.025	54.045	55.065	56.084	57.104	58.124	59.144	60.163	500
600	61.183	62.203	63.222	64.242	65.262	66.282	67.301	68.321	69.341	70.360	600
700	71.380	72.400	73.420	74.439	75.459	76.479	77.498	78.518	79.538	80.558	700
800	81.577	82.597	83.617	84.636	85.656	86.676	87.696	88.715	89.735	90.755	800
900	91.774	92.794	93.814	94.834	95.853	96.873	97.893	98.912	99.932	100.951	900
1000	101.972	102.990	104.011	105.031	106.051	107.071	108.090	109.110	110.130	111.149	1000



PRESSURE

POUNDS PER SQUARE INCHES TO KILOGRAMS PER SQUARE CENTIMETERS

lb/in <sup>2</sup> (psi)	0	1	2	3	4	5	6	7	8	9	lb/in <sup>2</sup> (psi)
	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	
—	0.0703	0.1406	0.2100	0.2812	0.3515	0.4218	0.4921	0.5625	0.6328	0.7031	—
10	0.7031	0.7734	0.8437	0.9140	0.9843	1.0546	1.1249	1.1952	1.2655	1.3358	10
20	1.4062	1.4765	1.5468	1.6171	1.6874	1.7577	1.8280	1.8983	1.9686	2.0389	20
30	2.1092	2.1795	2.2498	2.3202	2.3905	2.4608	2.5311	2.6014	2.6717	2.7420	30
40	2.8123	2.8826	2.9529	3.0232	3.0935	3.1638	3.2341	3.3044	3.3748	3.4451	40
50	3.5154	3.5857	3.6560	3.7263	3.7966	3.8669	3.9372	4.0075	4.0778	4.1482	50
60	4.2185	4.2888	4.3591	4.4294	4.4997	4.5700	4.6403	4.7106	4.7809	4.8512	60
70	4.9216	4.9919	5.0622	5.1325	5.2028	5.2731	5.3434	5.4137	5.4840	5.5543	70
80	5.6246	5.6949	5.7652	5.8355	5.9058	5.9762	6.0465	6.1168	6.1871	6.2574	80
90	6.3277	6.3980	6.4683	6.5386	6.6089	6.6793	6.7496	6.8199	6.8902	6.9605	90
100	7.0308	7.1011	7.1714	7.2417	7.3120	7.3823	7.4526	7.5229	7.5933	7.6636	100

KILOGRAMS PER SQUARE CENTIMETERS TO POUNDS PER SQUARE INCHES

kg/cm <sup>2</sup>	0	1	2	3	4	5	6	7	8	9	kg/cm <sup>2</sup>
	lb/in <sup>2</sup> (psi)	lb/in <sup>2</sup> (psi)	lb/in <sup>2</sup> (psi)	lb/in <sup>2</sup> (psi)	lb/in <sup>2</sup> (psi)	lb/in <sup>2</sup> (psi)	lb/in <sup>2</sup> (psi)	lb/in <sup>2</sup> (psi)	lb/in <sup>2</sup> (psi)	lb/in <sup>2</sup> (psi)	
—	14.22	28.45	42.67	56.89	71.12	85.34	99.56	113.78	128.01	142.23	—
10	156.45	170.68	184.90	199.12	213.35	227.57	241.79	256.02	270.24	284.46	10
20	298.69	312.91	327.13	341.36	355.58	369.80	384.03	398.25	412.47	426.70	20
30	440.92	455.14	469.36	483.59	497.81	512.03	526.26	540.48	554.70	568.93	30
40	583.15	597.37	611.60	625.82	640.04	654.27	668.49	682.71	696.94	711.16	40
50	725.38	739.61	753.83	768.05	782.28	796.50	810.72	824.94	839.17	853.39	50
60	867.61	881.84	896.06	910.28	924.51	938.73	952.95	967.18	981.40	995.62	60
70	1009.80	1024.10	1038.30	1052.50	1066.70	1081.00	1095.20	1109.40	1123.60	1137.80	70
80	1152.10	1166.30	1180.50	1194.70	1209.00	1223.20	1237.40	1251.60	1265.80	1280.10	80
90	1294.30	1308.50	1322.70	1337.00	1351.20	1365.40	1379.60	1393.80	1408.10	1422.30	90
100	1436.50	1450.80	1465.00	1479.20	1493.40	1507.70	1521.90	1536.10	1550.30	1564.50	100

KILOGRAMS PER SQUARE CENTIMETERS TO KILO PASCAL

kg/cm <sup>2</sup>	0	1	2	3	4	5	6	7	8	9	kg/cm <sup>2</sup>
	KPa	KPa	KPa	KPa	KPa	KPa	KPa	KPa	KPa	KPa	
—	98.1	196.1	294.2	392.3	490.3	588.4	686.5	784.5	882.6	980.7	—
10	1078.7	1176.8	1274.9	1372.9	1471.0	1569.1	1667.1	1765.2	1863.3	1961.3	10
20	2059.4	2157.5	2255.5	2353.6	2451.7	2549.7	2647.8	2745.9	2843.9	2942.0	20
30	3040.1	3138.1	3236.2	3334.3	3432.3	3530.4	3628.5	3726.5	3824.6	3922.7	30
40	4020.7	4118.8	4216.9	4314.9	4413.0	4511.1	4609.1	4707.2	4805.3	4903.3	40
50	4903.3	5001.4	5099.5	5197.5	5295.6	5393.7	5491.7	5589.8	5687.9	5785.9	50
60	5884.0	5982.1	6080.1	6178.2	6276.3	6374.3	6472.4	6570.5	6668.5	6766.6	60
70	6864.7	6962.7	7060.8	7158.9	7256.9	7355.0	7453.1	7551.1	7649.2	7747.3	70
80	7845.3	7943.4	8041.5	8139.5	8237.6	8335.7	8433.7	8531.8	8629.9	8727.9	80
90	8826.0	8924.1	9022.1	9120.2	9218.3	9316.3	9414.4	9512.5	9610.5	9708.6	90
100	9806.6	9904.7	10003.7	10101.8	10199.9	10296.9	10395.0	10493.1	10591.1	10689.2	100

KILO PASCAL TO KILOGRAMS PER SQUARE CENTIMETERS

KPa	0	100	200	300	400	500	600	700	800	900	KPa
	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	kg/cm <sup>2</sup>	
—	1.020	2.039	3.059	4.079	5.099	6.118	7.138	8.158	9.177	10.197	—
1000	10.197	11.217	12.237	13.256	14.276	15.296	16.315	17.335	18.355	19.375	1000
2000	20.394	21.414	22.434	23.453	24.473	25.493	26.513	27.532	28.552	29.572	2000
3000	30.591	31.611	32.631	33.651	34.670	35.690	36.710	37.729	38.749	39.769	3000
4000	40.789	41.808	42.828	43.848	44.868	45.887	46.907	47.927	48.946	49.966	4000
5000	50.986	52.006	53.025	54.045	55.065	56.084	57.104	58.124	59.144	60.163	5000
6000	61.183	62.203	63.222	64.242	65.262	66.282	67.301	68.321	69.341	70.360	6000
7000	71.380	72.400	73.420	74.439	75.459	76.479	77.498	78.518	79.538	80.558	7000
8000	81.577	82.597	83.617	84.636	85.656	86.676	87.696	88.715	89.735	90.755	8000
9000	91.774	92.794	93.814	94.834	95.853	96.873	97.893	98.912	99.932	100.951	9000
10000	101.972	102.990	104.011	105.031	106.051	107.071	108.090	109.110	110.130	111.149	10000

TORQUE

FOOT POUNDS TO KILOGRAMMETERS

ft. lbs.	0	1	2	3	4	5	6	7	8	9	ft. lbs.
	kg-m	kg-m	kg-m	kg-m	kg-m	kg-m	kg-m	kg-m	kg-m	kg-m	
—	0.138	0.276	0.415	0.553	0.691	0.829	0.967	1.106	1.244	1.382	—
10	1.382	1.520	1.796	1.934	2.073	2.211	2.349	2.487	2.625	2.764	10
20	2.764	2.902	3.178	3.316	3.455	3.593	3.731	3.869	4.007	4.146	20
30	4.146	4.284	4.560	4.698	4.837	4.975	5.113	5.251	5.389	5.528	30
40	5.528	5.666	5.942	6.080	6.219	6.357	6.495	6.633	6.771	6.910	40
50	6.910	7.048	7.324	7.462	7.601	7.739	7.877	8.015	8.153	8.292	50
60	8.292	8.430	8.706	8.844	8.983	9.121	9.259	9.397	9.535	9.674	60
70	9.674	9.812	10.088	10.227	10.365	10.503	10.641	10.779	10.918	11.056	70
80	11.056	11.194	11.470	11.609	11.747	11.885	12.023	12.161	12.300	12.438	80
90	12.438	12.576	12.852	12.991	13.129	13.267	13.405	13.544	13.682	13.820	90
100	13.820	13.958	14.235	14.373	14.511	14.649	14.787	14.925	15.064	15.202	100

KILOGRAMMETERS TO FOOT POUNDS

kg-m	0	1	2	3	4	5	6	7	8	9	kg-m
	ft. lbs.	ft. lbs.	ft. lbs.	ft. lbs.	ft. lbs.	ft. lbs.	ft. lbs.	ft. lbs.	ft. lbs.	ft. lbs.	
—	72.33	79.57	86.80	94.03	101.27	108.50	115.74	122.97	130.20	137.43	—
10	144.67	151.90	159.13	166.37	173.60	180.84	188.08	195.30	202.54	209.77	10
20	217.00	224.23	231.46	238.70	245.93	253.17	260.41	267.63	274.87	282.10	20
30	289.34	296.57	303.79	311.04	318.27	325.50	332.75	339.98	347.21	354.44	30
40	361.66	368.89	376.12	383.36	390.59	397.82	405.07	412.30	419.53	426.76	40
50	434.00	441.23	448.45	455.70	462.93	470.17	477.41	484.64	491.87	499.10	50
60	506.34	513.57	520.80	528.04	535.27	542.50	549.75	556.98	564.21	571.44	60
70	578.68	585.91	593.14	600.38	607.61	614.85	622.09	629.32	636.55	643.78	70
80	651.00	658.23	665.46	672.70	679.93	687.17	694.41	701.63	708.87	716.10	80
90	723.34	730.57	737.80	745.04	752.27	759.51	766.75	773.98	781.21	788.44	90
100	800.00	807.23	814.46	821.70	828.93	836.17	843.41	850.64	857.87	865.10	100

TEMPERATURE

FAHRENHEIT TO CENTIGRADE

°F	°C	°F	°C
-20	-28.9	90	32.2
-15	-26.1	95	35.0
-10	-23.3	100	37.8
-5	-20.6	105	40.6
0	-17.8	110	43.3
1	-17.2	115	46.1
2	-16.7	120	48.9
3	-16.1	125	51.7
4	-15.6	130	54.4
5	-15.0	135	57.2
10	-12.2	140	60.0
15	-9.4	145	62.8
20	-6.7	150	65.6
25	-3.9	155	68.3
30	-1.1	160	71.1
35	1.7	165	73.9
40	4.4	170	76.7
45	7.2	175	79.4
50	10.0	180	82.2
55	12.8	185	85.0
60	15.6	190	87.8
65	18.3	195	90.6
70	21.1	200	93.3
75	23.9	205	96.1
80	26.7	210	98.9
85	29.4	212	100.0

CENTIGRADE TO FAHRENHEIT

°C	°F	°C	°F
-30	-22.0	28	82.4
-28	-18.4	30	86.0
-26	-14.8	32	89.6
-24	-11.2	34	93.2
-22	-7.6	36	96.8
-20	-4.0	38	100.4
-18	-0.4	40	104.0
-16	3.2	42	107.6
-14	6.8	44	111.2
-12	10.4	46	114.8
-10	14.0	48	118.4
-8	17.6	50	122.0
-6	21.2	52	125.6
-4	24.8	54	129.2
-2	28.4	56	132.8
0	32.0	58	136.4
2	35.6	60	140.0
4	39.2	62	143.6
6	42.8	64	147.2
8	46.4	66	150.8



## 12-16K-4

